Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves
PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY
MONADNOCK BLOCK, CHICAGO

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Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1897

Volume 65
Number 4

CHICAGO, SATURDAY, JULY 26, 1913

Subscription - 10 Cents a Copy
$3 a Year U.S., Cuba and Mexico
$4 Canada, $5 Other Countries

LINCOLN ON HAPPINESS.

Do not worry; eat three square meals a day; say your prayers; be courteous to your creditors; keep your digestion good; exercise; go slow, and easy. Maybe there are other things that your special case requires to make you happy, but, my friend, these I reckon will give you a good lift.—Abraham Lincoln.

The Operating Force.

A subject which is of more than passing interest to the management of a manual exchange is that regarding the operator question. During the past few years with the expansion of telephone service, there has been a continual demand for more operators. The matter of handling them in order to retain them as long as possible in the company's employ, has accordingly attracted considerable attention, as it was found out that the average length of time an operator remained with a company is only about two years. As it takes about six months, in addition to financial expense, for a beginner to develop into an efficient operator, it was readily seen that one method of maintaining an efficient operating force was to strive to lengthen the operator's period of service. Hence a study of methods for accomplishing this purpose would be productive of great good.

The means to be adopted for obtaining the right kind of operators is important to every manager. There are methods which should be avoided in order to secure the most desirable applicants and also plans which work out admirably in providing an available list. The operating man who has a satisfactory list of desirable applicants, and one which is constantly replenished, is fortunate indeed. But such a condition is not due to good fortune. It is due to an understanding of the fundamental principles involved in the selection, training and handling of the various persons who are responsible for the operating service.

The subject of the operating force is a broad one and involves many points, all of which are worthy of careful consideration. The article by Mr. Peavey, which appears on other pages of this issue, indicate many features of the operating force which have, when followed out, been productive of excellent results.

The Missouri Meeting.

The Missouri State Telephone Convention, called to meet in Sedalia August 20 and 21, as related in the news pages of this issue, is a step in the right direction. A new condition arises whenever a state commission is established to regulate public utilities—a condition that telephone men should be prepared to meet. The Missouri call wisely states that it is not the purpose of the new organization to oppose the workings of the commission, but rather to aid in enforcing its rulings by co-operating in carrying out the provisions of the law and assisting it to fix fair rates and just rules and regulations for both the public and the companies themselves.

In a letter to TELEPHONY, Secretary Ed. A. Hook says the leaders in the movement intend to make the Missouri organization one of the strongest in the United States and to carry out exactly what the call declares should be done. There is plenty of work for such an association. The call is being sent out to all telephone companies in the state regardless of toll line connections, whether Independent or Bell. The furnishing of telephone service in this age of state commissions is a business pure and simple, and all companies engaged in that business can profit materially by co-operation such as the Missouri convention call describes and recommends. The establishment of public utility commissions by the states and the jurisdiction over telephone companies now held by the federal Interstate Commerce Commission certainly present new conditions that require telephone managers and owners to keep awake. It is the province of these commissions to safeguard the investment and rights of the companies as well as the interests of the public, and organizations acting along the lines defined in the Missouri call can undoubtedly accomplish a vast amount of good.

Mind Your Own Business

By HERBERT KAUFMAN

There are three sides to every dispute—the inside, the outside, and the wrong side. Make sure you see the right side when you pass judgment. But before you bother about the matter at all, figure out whether it's an affair of yours to give an opinion. Chances are that you are a meddling, muddling, interfering butter-in—a self-constituted, unsummoned jury of one.

See to it when you chase chickens out of your neighbor's garden that you don't create more havoc by trampling down the flowers.

Mind your own business. If you have one, it needs all the attention you can give it. If you find that you have attention to spare, you need a new sort of business.

Active critics are usually lazy builders. Men who are accomplishing most in the world are constantly figuring how they can squeeze out a little more time to catch up with their back work. No real busy body was ever a busybody.

Lending advice is like lending money—it destroys every other friendship. A still tongue is a multitude of virtues.

Get out of the habit of making other people's beds. Keeping your own comfortable is a good-sized life-task.

There's always a bit of glass in every cottage, and when you feel that desire to break somebody else's windows, first take a squint at your own. If you look with honest eyes, you will see enough targets to occupy your attention without quitting the premises.

The law against snarling curs is not nearly so necessary as a statute against snarling gabbers. It isn't the canine who most needs the muzzle. Dog bites are not nearly so deadly as gossip-bites. They're easier to cure and far less poisonous. There are mighty few deaths from hydrophobia, but irresponsible slander has piled up a mortality as heavy as that of war. Men and women struck down by the arrows of rumor, outnumber those who have fallen by the rifle.

The man who shoots off his mouth and kills a good name deserves as much punishment as that other type of prize idiot, who shoots off a gun without noticing where it is pointed. The fact that neither one knows "it is loaded" doesn't heal the hurt.

"See, hear, and speak no evil" is one of the first lessons implanted in the mind of a Japanese child.

The world is not nearly so bad as it has been painted. The average human is a pretty decent individual. Folks who have the habit of discounting the best in men and women have gotten the viewpoint from themselves. A thief has confidence in no man's honesty—the wanton, ridicules the virtue of all women. They who constantly mistrust are most to be mistrusted.

Old Doctor Watson made a practice of presenting to each of his graduates a little printed card. "I have merely taught you your A-B-C's," he would say, "your real education is now about to begin. You'll find life less of a problem if you bear these few lines in mind:

"No. 1. When you're speaking evil of a woman, picture your own mother, or sister in her place. When you're right, you're wrong.

"No. 2. If you think that a man is a thief, tell the police. If your facts are not strong enough to warrant a warrant, they do not justify the accusation.

"No. 3. Distrust 'hearsay.' It's as cowardly to judge an absent man as it is dastardly to strike a defenceless one.

"No. 4. For use when you can't think of any other rule—Mind your own business."

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Selecting, Training, and Maintaining an Operating Force

The Three Fundamental Factors Which Must Be Understood to Obtain Satisfactory and Permanent Results in an Operating Force—Discussion of These Factors With Suggestions Relating to Employment, Compensation, and Management of Operators

By J. E. Peavey

At the present period of the telephone development no subject is of more vital interest to the operating man than that of selecting, training, and maintaining an operating force. Particularly is this true of the spring and summer months, for at this season of the year the average office experiences very trying conditions in maintaining an adequate and efficient force of operators. Methinks that there are many good, genial telephone men who will not agree with Mr. Tennyson in his sentimental reference to springtime, especially with reference to their individual cases. However, Mr. Tennyson never managed a telephone office and is not to be censured for not having furnished verses for the encouragement of those who hold the bag for romance seekers.

J. E. Peavey.

Many good articles, containing valuable suggestions from practical sources dealing with operating problems, appear in the technical journals from time to time, and it is with a view to adding to this fund of accumulating information that the author has the temerity to present this discourse setting forth ideas and suggestions gathered from a wide range of observation and experience. The recommendations and suggestions presented herewith have had sufficient trial in the service to prove their efficacy, and it is hoped that they may prove of interest, if not of real service, to those in need of assistance.

Owing to the many factors connected with the details of specific cases, when given and followed up with full description and discussion, it is thought best to treat the subject in a general way and leave the details for those who wish to profit from experience in working them out. However, it is intended to incorporate sufficient information to enable one to see the situation as the author sees it. A few practical ideas may be gained as material for thought or possibly followed up to a profitable termination.

In dealing with the problem of selecting, training and maintaining an operating force, there are three fundamental factors that must be well understood and put right from a functional standpoint before any satisfactory permanent results can be obtained. They are: the employer, the employe, and the pay. Some may wish to further subdivide and add the class of the employment, but it is not here so considered and the reason therefor will be explained later. Owing to rank the functions given will receive the first attention, after which other details will be taken up in regular order.

The Employer.

In all cases there must be an entity before there can be an action, and in this case the telephone company is the entity and source of all action in its particular line of endeavor. Its motives are formulated to accomplish some specific purpose, and that purpose is monetary; at lease the writer has never heard of a telephone company which was organized as a charitable institution.

If in the pursuit of its object the company becomes blinded by its ambition for money gathering, and callous to human requirements, it will not appreciate the fact that it is being conveyed by a frail material structure, endowed by nature with needs, desires, and ambitions which must also be fed if the ship is to be held intact and in the lead before the high winds of progress.

Fortunately the telephone companies have, generally speaking, been very considerate of their army of workers. As a consequence it is hard to find a more loyal, earnest working, and faithful lot of employes gathered around the standard of any other institution.

The policy of a company is of course shaped by the high officials, who pass out routine instructions to subordinate representatives to be executed as specified. The subordinate representatives are generally known as superintendents, or managers, and will be referred to here only as managers. This particular position of manager is one of great importance, as he is the representative of the officials to the mass of employes and vice-versa.

The manager is the real employer and fountain-head from which all inspiration and action flows. He is responsible to those above him for the conduct of those under his supervision, and the character of the service rendered. The degree of his proficiency, in a large measure, adds to or detracts from the employment under his charge. Should anyone doubt the value of the personal equation as an asset in this case, it would be profitable for him to give this feature a little more careful analysis and personal attention.

The company will have importance and prestige in a community in proportion to the general application and value of its commodity, and, if the policy pursued with the public is one of fairness, the company's prestige may be a great asset for good in many ways. The manager can materially influence this prestige. Particularly is this true from the employer's, or employe's standpoint, and the better it is understood, the better the results in any locality.

The efficient manager will possess skill in many ways so that he may obtain for his company the full value where its interests are at stake. If he does not know how to make use of both the tangible and intangible forces at his disposal, he must experience inconvenience, the company loses, and often the public may suffer.

From the foregoing it may be seen that we have an employer composed of two elements, the company and the manager or company's representative; both having their particular functions. While that of the manager is only secondary, it is none the less important and warrants all of the consideration herein intimated or specified.

The Employe.

The first matter to consider when selecting employes, is

their age and moral proclivities. Girls between the ages of 16 and 20 years, make the best operators, but unfortunately some of the states have laws prohibiting girls under 18 years of age working on the evening tricks. Operating schedules are adjusted to care for the daily fluctuating loads which usually require a large force in the evenings, and for the sake of fairness, all employes should be require to take a turn at evening work.

Little comment is necessary on the moral features of either applicants or employes who have entered the service, for there is but one rule. That is: not to consider them if there is evidence of being, or coming from immoral associations.

A second consideration of new employes is their fitness for the particular position they are to fill. That is: an employe must not be intellectually too light or too heavy. If employes have or think they have too much learning for the position they hold, they will never be satisfied, and will not remain long in the service. Being able to select and fit the employe to the position is one of the most important factors that leads to success, and it will be worth anyone's time to make a few well planned observations along this line, particularly if experiencing trouble with the force.

There are, broadly speaking, two classes of employment for girls in a telephone office, one at the local, and the other at the toll switchboard. The local board does not require a great amount of common school education as the work is, so to speak, stereotyped, it being only necessary to perform a few mechanical operations with fixed phrases; but the future of the employe will be very materially affected by the lack of a fair amount of education to aid in securing promotion, or a higher class of employment. Toll operating on the other hand calls for at least a good common school education, combined with a great amount of skill and ability otherwise.

Every town or city is composed of various classes of people, industrially speaking, that may be drawn upon to fill positions in the various industries, and if properly selected with respect to the work to be performed, a reasonable maximum service will be obtained.

If employes are too high bred for the employment, much dissatisfaction will result, and difficulties will be encountered.

Broadly speaking, in all cases the employe will be satisfied if carefully selected for the work, and given fair compensation and treatment by the employer. For this reason the author does not use the class of work as a fundamental element in the employe problem.

Employes' Pay.

All employes should have more money. Few get what they are worth, and naturally another few get more than they are worth; but they are able to make use of the money, so that it circulates and does some good. Besides we should not care as long as it is not ours and they are able to get away with it, and are satisfied.

The payroll is usually the largest current expense item of an operating company. It should receive a great amount of study and attention, for the pay schedule can be abused in either an upward or a downward direction. It does happen that companies appropriate enough money in the aggregate, but owing to lack of system or unmethodical distribution, neither the company nor employes receive the full benefit of the allowance. A uniformly graduated scale of pay should be arranged so that all employes can see what they have before them to serve as an incentive for good and encouragement in the performance of their duties.

The pay problem can always be brought up as a panacea for all ills that lack of skill cannot diagnose or fathom. Hence the matter should have the most careful analysis and attention under all circumstances to see that there are no abuses in any direction, and to be certain that all receive, relatively speaking, a fair and reasonable compensation.

If the foregoing conditions are being observed, there should be little dissatisfaction or trouble as the result of the pay problem.

Length of Employes' Service.

The average length of an operator's term of service is from one to three years in the various offices throughout the country, with probably a general average of about two years. When it is considered that it requires at least six months as a rule for a new beginner to begin to show proficiency in the work, and that it costs the telephone company anywhere from $25 to $200 to prepare or school a student for the work, the matter calls for no small amount of attention, and every effort should be made to lengthen the average term of service. Not alone is this true from an economical standpoint, but the efficiency of the service demands it.

The revenue of telephone companies may be ever so lucrative, but, as all know, conditions are changing and it is growing more imperative that business be conducted not alone economically but efficiently from a service or utilitarian standpoint. That the average term of service may be lengthened is a question which appears to be within the powers of the local authorities. The average length of service should at least be between two and one-half and three years, and rarely a minimum below two years. The foregoing figures may appear high, but the author's observations in many localities, has only been convincing that there is a lot of room for improvement, and that the figures submitted are reasonable and consistent with economical and efficient management.

Obtaining Employes.

The good conditions in an office should not be based upon the ease with which help is obtained, but upon the absence of a necessity for new help to replenish the forces. However all offices will require new employes, for one purpose or another, from time to time. If the application files contain the names of desirable applicants, there should be no trouble in securing the necessary help, but if there are no names on file, it is fairly good evidence that something is wrong. In the first place there should always be names of desirable applicants on file, irrespective of the immediate needs of the office, for losses in the force may occur at any time and it is the ever preparedness that makes for good management.

An office that does not receive a reasonable amount of applicants should lose no time in investigating, finding, and removing the cause. Either the office has some objectionable feature or features that may be removed, or other matters are bringing undue influence against the employment.

As an aid in keeping the application files replenished with the names of desirable applicants, it is well to keep in touch with doctors and ministers. Frequently the corner grocery can render a great amount of assistance.

One of the most efficient sources of obtaining the names of desirable applicants, is through the business getters, or solicitors for the company. The solicitors come in contact daily with the citizens and can be so instructed that they may do a lot of effective work along this line without materially affecting their regular daily routine work of getting business.

Newspaper advertising for girls, for various reasons, should never be resorted to except in cases of extreme emergency. There are so many other ways and means of obtaining help in a routine way, that no one should suffer material inconvenience at any time. This, like other details of the business, calls for ingenuity and skill, and those responsible for the guidance of the office should leave nothing undone toward working every faculty and facility up to its most efficient limit.

Training Operators.

Training girls for the position of telephone operator has nothing uncommon from that of training children, and varies only in quality and not in quantity of training.. Unfortunately

many offices do not have the facilities for training their employes and they suffer materially in many ways as a consequence. Training employes does not simply mean to school a student in a few fixed words, phrases, and deftness in handling plugs at the switchboard, but every element which enters into the individuality that makes for character, service and efficiency should be brought out and developed. Furthermore training should never cease as long as the employe is connected with the company, but should only change in degree as the employe advances.

Relatively speaking, the results obtained with employes will be in proportion to the amount and character of the training given them. Hence a great amount of care should be exercised in selecting and applying a course of training, being sure that all of the features that are to be improved are included. It is not uncommon for an office to take on new help which has grown up to maturity without any sense of restraint or responsibility. To discipline them in the short time allowed for schooling a student is a rather large and difficult undertaking, but it can be satisfactorily handled where there are provisions for the task.

Operating a telephone switchboard is becoming more and more exacting and along with this condition the business is increasing rapidly, calling for more and more help annually. Those who are going to be the most successful in meeting and mastering the problems that arise, will be those who give all of the time and investment consistent with the conduct of the business, to the provision of ways and means to accomplish the foreseen and desired results. This does not mean that elaborate training schools shall be provided in all cases, but the better and more thorough the schooling facilities, the better the results. It is within the power of all offices to establish some form of schooling, and the extent of the undertaking will, in a large measure, depend upon the ingenuity and skill of the management.

Whatever system or course is pursued, there should in all cases be added a post graduate course for chief operators and supervisors, for it is through these employes that the future results will be accomplished with those under their supervision.

It is, generally speaking, to the lack of proper training and skill along certain lines on the part of office supervising forces, that a large percentage of the employe troubles are due, and every attention and effort put forth in systematically training the supervising forces will be returned in manifold good results.

At the present time all schooling consists principally of instruction for line operators, giving routine requirements in rendering service at the switchboard. Comprehensive specific instructions on the best methods to pursue in maintaining a force of employes are superficially treated, and those who are experiencing trouble will be wasting no time in developing a system of instructions on this specific feature of the business. The material to be had for such a course will be found in abundance. After the attention has been centered for a time on the particular feature, it will be found to be an interesting and absorbing subject that has, apparently, not been given the attention which the exigencies of the business demands.

Managing Operators.

To get the maximum results with employes, the schooling and training must be of the most painstaking nature, giving each individual employe all of the attention necessary to remove objectionable features, and to bring out the latent good qualities.

Schooling and training as here used, means not alone the elementary training given upon the employe entering the service, but the advice and instructions given all during the employe's term of service.

After an employe finishes her elementary training and takes up a position at the switchboard, it naturally follows that the most economical and efficient future training will come from the supervising forces in charge of the office and responsible for the service. If the supervising forces, including chief operators, have the proper qualification for the particular duties that go with the position, there will be few cases of tardiness, demoralization, or frequent changes in the force which cannot be materially improved.

Girls as a rule are attentive and obedient. If intelligently supervised many apparent objections may be in part, or entirely, overcome. To intelligently supervise girls means in part, that their natures, generally speaking, should be understood, and conditions and environments so adjusted as to conform, as far as consistent, with their likings. Every one knows that agreeableness in association and surroundings makes for attachment to occupation and efficient service.

Girls enter life and the business profession at a different angle from their male contemporaries, and at the present period of the human race cannot see the necessity for a trade or profession. Hence their great inclination to change employment upon the slightest pretext or inducement. It is to overcome this and other minor objections that the employer must exert his ingenuity and best effort, for the exigencies of the business are calling for the effort. That much good may be accomplished goes without saying. It is only a question of understanding the elements that make up the problem, and then having the inclination, patience, and skill to apply the remedy.

Eastern Pennsylvania Independent Telephone Association.

The first quarterly meeting of the Eastern Pennsylvania Independent Telephone Association convened in the ball room of the Colonial Hotel, York, Pa., on July 16, with J. F. Stockwell, of the Keystone Telephone Co., Philadelphia, president of the association, in the chair. About 200 delegates were present at the meeting. The final arrangements for the program were made at a preliminary meeting held on the evening of July 15.

The program as adopted included papers on "Traffic Toll Business" by A. J. Ulrich, traffic manager of the Keystone Telephone Co., of Philadelphia; "The Routing of Toll", by H. E. Bradley, secretary of the traffic association; "By-Products of the Telephone Business," by I. C. Forshee, electrical engineer of the Pennsylvania Railroad Co., and "Call Distribution," by George B. Rudy, manager of the York Telephone and Telegraph Co., York, Pa. Following these papers the reports of committees were received and discussion was held respecting the new public service act of Pennsylvania, a summary of which act is published in this issue of Telephony.

Meeting of Western Pennsylvania Association.

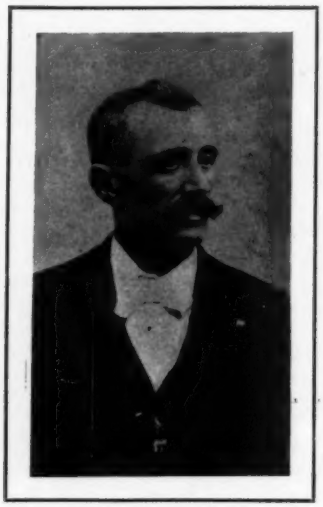
The meeting of the Western Pennsylvania Independent Telephone Association at Erie, Pa., on July 11 and 12 was attended by about 50 representatives of Independent telephone companies in Western Pennsylvania, eastern Ohio, northern West Virginia and eastern New York. Supply houses and manufacturing companies were also represented. The improvement of long distance telephone service between Erie and Pittsburg and Buffalo was one of the subjects discussed and a committee was appointed to work in behalf of further improvement in this service. The members present discussed the desirability of forming new Independent telephone companies and went on record in favor of as much expansion as possible in this direction.

Lansing Alderman Objects to Payment in Advance.

Some agitation has arisen in the common council at Lansing, Mich., directed at the custom of the Citizens' Telephone Co. in requiring three months' rent in advance for telephones. Alderman Homer Parker declares he will introduce an ordinance in the near future to amend the existing ordinance so that the practice will be forbidden.

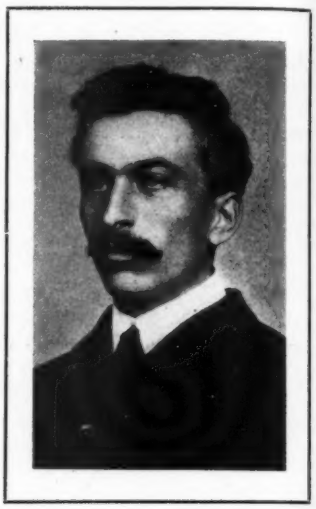
A Quartet of Men Prominent in the Telephone Field

C. A. CAMP, president of the Washington Home Telephone Co., Washington, Ill., treasurer of the Peoples Telephone Co., Chillicothe, Ill., and secretary and treasurer of the Henry Telephone Co., Henry, Ill., was born at Henry, Ill., in June, 1856. He was educated in the public schools and then took a commercial course at the Grand Prairie Seminary, Onarga, Ill. Mr. Camp has spent most of his career at Henry, Ill., where from 1875 to 1900 he operated "Camp Home" hotel. He was postmaster at Henry for four years under President Roosevelt, was alderman for two terms and mayor of the city for one term. He started in the telephone business at Henry, in September, 1898, with 25 telephones. The Henry Telephone Co. now has 700 telephones in Henry and vicinity and all the stock of the company is held in the families of Mr. Camp and E. S. Sterrett, his original partner. Mr. Camp is now also interested in the telephone companies at Chillicothe, Washington, Sullivan, Carlinville, and Abingdon. Mr. Camp was secretary for one term of the Illinois Independent Telephone Association. He is a member of the Henry Commercial Club.



GARRISON BABCOCK, vice-president and general manager of the North Electric Co., Chicago, was born at Canaseraga, N. Y., in July, 1879, and attended the district school and the grammar, high and private schools in Buffalo. He served an apprenticeship in the electrical shop of F. P. Little & Co. while taking an electrical course under J. W. Sawyer, E. E., of London, Eng. He began telephone service with the Bell company at Buffalo, as inspector, in 1897. In 1900 he became state inspector for the Wisconsin Telephone Co. From 1897 to 1898 he was electrician on the U. S. S. Buffalo, and in 1900 became general manager of the Wood Co. Telephone Co., of Grand Rapids, Wis. From 1901 to 1903 he was sales engineer for Stromberg-Carlson Telephone Mfg. Co., and in 1904 became general manager of the Home Telephone Co., Albion, N. Y., where he built an 800-line plant, lockout telephone system. He was consulting engineer at Rochester from 1904 to 1908, and from 1908 to 1909 was engineer for the Telechronometer Co., since which he has filled his present place. Mr. Babcock is a Mason.

WILLIAM J. LANSLEY, of Perth Amboy N. J., president of the Hudson & Middlesex Telephone & Telegraph Co., auditor of the Monmouth Lighting Co., director of the Monmouth Toll Line Co., and director of the Eagle Fire Insurance Co., was born at Poultney, Vermont, in June, 1868, and was educated at Rutgers College, class of '88, where he received the degrees of B. S. and E. E. He was engaged as a civil and electrical engineer from 1888 to 1901 and in the latter year entered the telephone field and engaged in consulting engineering work. He was superintendent of the Hudson & Middlesex Telephone & Telegraph Co., from 1901 to 1906, and has since that time been president of the company and a director of the Monmouth Toll Line Co. He was president of the New Jersey State Telephone Association from 1911 to 1913. Mr. Lansley's engineering experience has included that of consulting engineer for the Monmouth Lighting Co. and for various municipalities. He is a member of the American Society of Electrical Engineers, and other electrical societies.



F. TRAUTWEIN, Morrison, Ill., secretary and manager of the Whiteside Farmers' Mutual Telephone Co., Morrison, Ill., was born in Henry county, Ill., in June, 1868, and was educated in the common schools. Mr. Trautwein traveled for a number of years for a Chicago wholesale house and engaged several times in mercantile enterprises. He first entered the telephone field when he took charge of the Whiteside Farmers' Mutual Telephone Co., in January, 1903. He was elected, at that time, one of the company's seven directors and has been re-elected on the directorate each year since that time, while also serving as secretary and general manager. When he took charge of the company it had only 30 subscribers and had an indebtedness of $1,250. As a result of Mr. Trautwein's energy and perseverance the company now has 900 telephones and no indebtedness. During the past 10 years Mr. Trautwein has given various farming communities the benefit of his experience with the Whiteside company, having helped to organize several other mutual telephone companies. He is a Mason.

An Obstacle Removed

A July Incident—The Chicago Situation

By J. C. Kelsey

The patient was hopelessly ill:

He was in great pain, and unquestionably in the preliminary agonies of death.

It would have been a welcome mercy to shoot him, hit him with an axe, or give him a potion which would let him die quickly.

But you would not have done the shooting, nor would I have given him the death potion, however much he begged for death and so richly deserved relief from his sufferings.

For the law does not allow human beings to be put to death, except in a legal way.

You could have done nothing but watch him die in his prolonged agony.

In our industrial life we have had such a patient:

A hopelessly ill company, in great financial pain, and unquestionably in the early agonies of death.

For years we have stood by, watching at the bedside of the patient but simply helpless to aid him to recover, or to speed his death.

We have all known that the Independent telephone company sometimes called the subway or tunnel company, has been ailing. In fact its distress began at birth. It was an unwelcome child. It came to us gnarled and twisted, and in speechless deformity.

How many conventions have we been waiting for its speech, so we could find out its intentions?

According to the press, the patient has been put out of its misery. It seems it was done last May, and by whom, of course, you can guess. The identity of the good Samaritan is none other than the great American easy mark, the Bell concern.

They are said to have paid $5,000,000 for this burlesque telephone enterprise. Just why they parted so cheerfully with this much money for so much absolute and useless waste is beyond my comprehension; especially after making such a loud noise about waste.

Still I have known long that the Bell company will pay a much better price for sick property than for some perfectly healthy one.

I feel relieved.

The cat is out of the bag.

All the vast promises have come to naught, and we know now what to expect.

According to the tunnel company's lawyer, the date of the funeral is entirely in the hands of the Chicago Telephone Co.

I am pretty sure that there will be plenty of press notices sent out, so that no one will miss it.

I am glad the patient is dead, and out of its misery. If I had one wish, it would be that every ailing company would be put out of its misery.

I wish that every telephone company could be unmasked, so that its neighbors could settle down in some security.

The passing of the tunnel company will have little or no effect on the telephone situation.

It should discourage no one. The company had no right to be born.

It seems that a few men conceived the idea of freight tunnels under Chicago.

In their dreams they could see millions and millions, and they tried to pull enough freight through a small hole to make the millions good.

To get such a privilege, they had to appeal to the prejudice of the people. The Chicago Telephone Co. was an easy mark—and a shining one too. So the promoters of the tunnel asked for a franchise for a telephone company which would bring peace, tranquillity and low rates to Chicago people.

After they got the franchise, they started to dig great big holes, so much bigger than a telephone company needed.

Then it was discovered that they really wanted to haul freight, mail, etc., and they got the permission, for, as usual, Chicago locked the barn door after the horse was gone

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Telephone matters languished.

And we waited; and we heard silvery promises; and then golden promises, and then some.

Finally, the tunnel company, not being able to push freight through these small holes, failed.

What in the world would we do if we could not fail?

School books teach much about success; and they hedge failure about with all the categorical sins.

But today failing is succeeding.

It was then that the telephone was called upon to earn 5 per cent. on $20,000,000 worth of bonds.

It was cheerfully estimated that 20,000 telephones would earn $50 each year, and that the bondholders would live happy ever after.

Do you know of any telephone earnings which amounts to $50 gross per telephone?

Most of them range from $40 down to $13.

Upon the telephone was thrust a most cruel load—to earn $50 net upon each station—and, of course, it fell down under the load.

But failing is succeeding.

In the New York gas case, the courts decided that any corporation was justified in buying up its competitor, scrapping it, and adding the cost of the purchase to the rate making capitalization.

The courts merely played a nice little joke on the public; and also gave a premium to any competitor to enter into business, however recklessly.

What a magnificent sleight-of-hand performance it is!

Eliminate a losing corporation at a profit, merely merge it with yours and it instantly becomes a live one.

By buying the tunnel telephone property at $5,000,000 the Chicago Telephone Co. can add $5,000,000 to its capitalization and make 8 per cent. on the money.

As the tunnel company stands, it cannot make 1 per cent. on $5,000,000.

Really a decision giving a corporation the right to add the cost of a competitor to its capital account is a joke on the public as well as the courts.

It puts to smash all our preconceived and vigorously taught notions that nothing succeeds like success, and other pretty ideas from little boys' copy books.

So if you have a company which cannot earn its salt, combine with your competitor at a dandy big figure, and then you won't have to work so hard.

Save all idle effort, and let the public pay you for loafing.

Such a decision increases the value of mediocre stock a great many points.

As I write I am in a west-bound New York Central train.

Naturally I am in rather a scolding mood. It is tiresome work riding on a train. I wonder if you think I am a chronic scold. Or a cheap muckraker, or one hunting trouble. Or one that knows it all.

I do vigorously disclaim knowing it all. I do know, however, that the dividing line between the telephone man who knows it all, and the one who knows the least, is not much more than a narrow street.

The telephone business is a big one. Things are done which are hard to understand.

And so many things which are done make me think that the earth has not lost full connection with divine influences.

So riding on the train I have nothing to do but write of something bearing directly or indirectly upon a business which I love, and one that you love, and you cannot deny it.

Before leaving the railroad matter, I can't help but refer to the competition between the New York Central and the Pennsylvania systems, each collecting a million dollars every day from the American people.

These two great industrial giants never quit watching one another, nor quit trying to cross one another, and reach into each other's exclusive points.

I am astonished to find that a Chicago man can take a fast train to Pittsburgh and can go on to Gettysburg or Baltimore.

Pittsburgh was almost as sacred to the Pennsylvania railway as New York is to the Bell Telephone Co.

One of these railway gaints knows how to run trains on time; and their switchmen do not try to smash their trains or knock sleepers from their berths.

The other knows all about maintaining a smooth track.

If these two giants could get together and teach each other the missing fundamentals of railroading, it would be a happy thing.

We can learn a lesson in the telephone business.

The Bell company seems to get new money easily; and they waste it magnificently.

No drunken sailor could trot in their class for extravagance and foolish waste.

Independent telephone companies have always had to face the problem of financing. But, oh, how they have learned to economize!

If these missing fundamentals were consolidated, the song of the stockholder would be heard all over the land.

As it is, we have a spectacle of Bell minority stockholders asking for a receiver of the Central Union Telephone Co.

We saw the Bell of Missouri cut its dividend from 8 to 4 per cent., and then saw the minority stockholders forced into a trade against their will.

And I can name groups of Bell minority stockholders who do not know what the word dividend means.

The failure of dividends was not entirely due to low earnings. It was due almost entirely to extragavance.

On the other hand, I can show you a successful Independent telephone company earning dividends honestly, yet forced to use its earnings for extension purposes. Because it can in this way get a dollar's worth of mercy for these dollars, and cannot get it elsewhere.

This company earns handsomely, has real reserves, operates economically and efficiently.

The failure of dividends is not due to rates nor net earnings. It is due to a restricted money market—frankly, a money trust.

This Independent telephone company will install a P. B. X. plant for one-fourth of what it costs a bunch of Bell employes to do it in the same place.

It actually requires from 8 to 10 Bell employes to do what 2 or 3 Independent employes can do. The reason is not personal. No personal reason exists why 2 or 3 men cannot do what 2 or 3 others can do.

The reason is that in the Bell service no one talks economy nor is interested in its unlovely form. They are led to believe that all is gold, and that express trains have nothing to do but haul Bell money around.

You don't have to go far to see the arithmetical demonstration.

It costs Independent telephone companies from $13 to $18 to operate and maintain a telephone.

It costs the Bell company $26 per telephone to do the same thing. The remaining $4 is the depreciation charge made by the Bell company.

The principal cause of this riotous money spending feeling of Bell employes is the example set by the officials.

It is their reckless purchase of competitors.

We have seen Detroit bought out three times. Even Sioux City has had three Bell experiences. And there are numerous other places.

The latest extravagance is the Chicago tunnel telephone.

The Bell interests are said to have paid $5,000,000 in May for a so-called telephone company; and one which never did affect the prosperity of the Chicago Telephone Co.

Outside of gratified vanity, there won't be $5 worth of real needful serviceable property available to Chicago Telephone Co.

I can't say that the Bell action is any of my business. They certainly have a right to do as they please.

We all know that "the fool and his money are soon parted" theory has been kicked into the scrap heap long ago.

My opinion has not been asked, nor was yours. Strange, too, isn't it?

But I must say that I am compelled to admit that there must be something in the divine right of the Plymouth Rock born corporation.

So many people have written, asking what effect this purchase will have on the Independent telephone situation.

As far as I can see, it will not affect you as much as the Balkan war.

It will help a great many Independent companies to find out where they stand. They will know what to do.

Nothing is so hurtful as the spectacle of a lingering losing wreck of a telephone company.

Let them die, so that their most successful neighbors will not be contaminated nor contract the disease.

I have heard a great deal about the Bell company's desire for peace; and that its desire for the gore of competitors had been satiated.

For a while I lulled myself to sleep believing that the wolf and lamb were to be drawn together. But the theory seems to be a great deal as the wolf, addressing the lamb, saying the war among animals was over, and to come out and play.

While he was talking, the baying of a rapidly approaching dog caused him to take to his heels.

He answered the lamb's query as to why he ran by saying he was afraid the fool dog had not heard the news.

I certainly admire the well simulated fear of the government and the Interstate Commerce Commission. The Bell bunch are awfully afraid of being slapped on the wrist.

Their very weight of respectability and morality will yet make the government humbly apologize for questioning their high and mighty motives.

One swallow does not make a spring—neither does the death of an ill-conceived Independent telephone company have any visible effect upon the telephone industry.

There never was any excuse for the second telephone in Chicago. Unlike other cities, Chicago saw great Bell development without the necessity of competition. Only the fear of it was necessary.

As far as I am concerned I thank the Bell for their benevolence in removing an imitation telephone company from our midst. I wish they would go further and clean up more cripples.

They seem to like to do it.

Their own cripples have never seemed to bother them. They seem to enjoy the company.

A typical play is being made in Chicago.

The Chicago Telephone Co. cannot wait any longer to show its irresponsibility. They have notified druggists to take out every telephone but theirs.

The idea is novel, too, that they have as much right to dictate to a druggist as they have to say what telephones shall be in their own branch offices.

If you don't watch out, these transcendentalists will figure out that there is no telephone but the one grand and universal one.

There is no God but Mahomet apparently.

Well, it's a wonderful business.

MORAL: Telephone wonders never cease.

Pittsburg Ruling of Interstate Commerce Commission.

In last week's issue of TELEPHONY there was briefly reported the decision of the Interstate Commerce Commission in which it ruled that it was without jurisdiction in the proceeding respecting telephone charges in Pittsburg. The full text of the commission's finding, which is written by Commissioner Clements, is published herewith as contributing to a better understanding as to the commission's jurisdiction:

This proceeding was instituted by the commission upon its own motion, acting upon informal protests received from subscribers to the local telephone service of Pittsburg, Pa. Protestants charge that they are being subjected to undue prejudice and disadvantage in violation of section 3 of the act to regulate commerce. The provisions of that act were, by amendment of June 18, 1910, extended to "telegraph, telephone and cable companies (whether wire or wireless) engaged in sending messages from one state, territory or district of the United States to any other state, territory or district of the United States, or to any foreign country."

The essential facts in the case are as follows: The local telephone service of Pittsburg is furnished by the Central District & Printing Telegraph Co., one of the subsidiaries, by stock ownership and control, of the American Telephone & Telegraph Co. The former company does not operate beyond the Pittsburg local exchange area, its toll and interstate calls being provided by means of connections with other separate corporations which bear the same relation as it bears to the American Telephone & Telegraph Co. There are no flat-rate annual contracts for long distance service from Pittsburg offered by any of the subsidiaries of the latter organization.

Prior to April 1, 1911, all patrons of the Central District & Printing Telegraph Co. were offered contracts which extended unlimited Pittsburg local service at a stated sum per annum. In the year mentioned this contract was discontinued, and new subscribers were thenceforth offered, instead, contracts providing for a certain number of calls at a given sum per annum, additional calls to be charged for at so much per call. The specific complaint of the protestants is that their annual charges under these later contracts are in the aggregate greater than the flat annual rate paid by the subscribers under the old contracts, many of which are still operative. It is explained by respondent company that the old contracts cannot be arbitrarily canceled as to the subscribers thereunder without serious injury to the company and its service, but that they are being eliminated as fast as practicable upon discontinuance of individual telephones or upon action with respect thereto, such as removal of the instrument to other buildings, that might be construed to constitute an abrogation of specific contracts.

The act to regulate commerce, by the same amendment as is above referred to, also provides that its provisions shall not apply "to the transmission of messages by telephone, telegraph or cable wholly within one state and not transmitted to or from a foreign country from or to any state or territory as aforesaid." It is therefore apparent that it must appear that the discrimination in the respect alleged affects the relative aggregate charges to the limited and unlimited service subscribers, respectively, on their interstate calls before this commission would have any jurisdiction over the subject matter of the protests.

As illustrative of the particular discrimination alleged with respect to interstate calls, we may take one of the old unlimited-service contracts, with its flat rate of $125 per annum, and compare it with that one of the various forms of limited service contracts which provides for 2,700 calls annually for $120, with additional calls at 4 cents each. It is contended by protestants that inasmuch as upon using the 2,700 calls and 125 additional at 4 cents each the total sum paid therefor would equal the unlimited subscriber's flat rate of $125, each call in addition to this aggregate of 2,825 subjects the limited service subscriber to an undue prejudice and disadvantage to the extent of the charge therefor. It was stated positively on behalf of the respondent company, however, that there is no such discrimination with respect to interstate calls, as the local call of the Central District & Printing Telegraph Co. used in connection therewith is not counted against either the limited or unlimited service subscriber. In other words, it is stated by respondent company, the situation with respect to interstate calls is in effect the same as if both the limited and unlimited service subscriber should go to the long distance station in person instead of securing their interstate connections through their local telephones.

It therefore appears that the discrimination complained of does not affect the interstate transmission service participated in by respondent company, which would be necessary to be shown before this commission would have jurisdiction of the matter. The case may arise in which unreasonableness or discrimination in telephone charges or services will so affect interstate transmission as to fall within the commission's regulating powers under the act to regulate commerce, but it seems clear that this is not such a case. It is manifest that in the present case whatever recourse protestants have, if any, must be secured through local or state authority.

Baltimore Company Increases Capitalization.

An amendment to the charter of the Chesapeake & Potomac (Bell) Telephone Co., of Baltimore City, has been filed increasing the capitalization of the company from $10,000 to $10,000,000. Stock will be issued to the extent of 199,800 shares of a par value of $50, or an aggregate sum of $9,990,000, and the stock and proceeds thereof will be used to reimburse the Chesapeake & Potomac Telephone Co., of New York, for the money advanced to bring the company to its present earning basis. This action, it is said, will accomplish the financial independence of the Baltimore company.

Police Signaling by Telephone

Police signaling systems in which the telephone furnishes the means for communication between signal station and police headquarters are coming more and more into universal favor as a reliable means of maintaining a check upon the movements of the police officers and of summoning aid in emergencies," says the Electrical Review and Western Electrician. One of these signaling systems has been installed at Plymouth, Pa., a town which lies in the heart of the anthracite coal mining district and which has a population of approximately 17,000 inhabitants, the majority of whom are employed in the mines in that vicinity.

Fig. 23. Removing Scale in Diluted Acid.

The telephone signaling stations are distributed over the business and residential sections of the town in such a way that the police officer is never very far away from one. The station telephones are of the familiar iron box type and are fastened either to the walls of buildings or to telephone poles. This type of telephone, with its heavy double iron door construction and moisture-proof apparatus and metal parts, is especially adapted to severe outdoor service. The outer door of each telephone is kept locked and can only be opened by those authorized to carry keys—the members of the police department and the township authorities. The opening of the outer door exposes only the talking apparatus. When both doors are closed, the telephones are moisture and dust-proof.

The signaling system is operated from a central battery at police headquarters. The line wires from the telephone station boxes are connected at headquarters to a cordless private branch exchange switchboard. This type of board is compact and small enough to be mounted on a desk, as has been done in this instance. On account of the small amount of space which it occupies, the operator can also attend to clerical duties.

A novel feature of the equipment is the manner in which calls are reported. The incoming calls are recorded on a Bristol recorder, which is located directly over, and connected to, the switchboard. At the headquarters' switchboard there are a number of resistances, no two of which are alike in value. One of these resistances is connected in the circuit of each police telephone box, so that the amount of current supplied to each telephone differs from that supplied to the others. The amount of current required for each of the signal boxes is a fixed known quantity. When the record is made on the Bristol instrument, the amount of current flowing is indicated on the sheet and shows which station has called. The sheets of the recorder give a permanent record of the calls made from each of the telephone stations, and in this way the movements of the police officers may be checked.

Fig. 24. View of Sulling Process.

Fig. 25. Dipping Rods in Milk of Lime.

Manufacture and Use of Wire for the Telephone Industry

Practical, Non-Technical Description of Processes Involved in Conversion of Iron Ore into Wire—Story of Iron Wire from Mine to Warehouse Told by Illustrations — Third Installment of Paper Presented at Annual Convention of National Association

By H. S. Durant, *American Steel & Wire Co.*

Whenever steel is heated in the presence of the atmosphere a slight scale of black substance forms upon the surface. Before the process of drawing can be carried on this black scale must be removed. This is done by means of diluted acid known as a pickling solution. The several bundles of rods that may be seen in Fig. 23 have just been immersed for a few moments in the vat of pickling solution (1). The scale has been eaten off by the acid, and the rods are now being lowered into a tub of hot water to rinse off the acid. At this point they are also sometimes washed with a hose to further remove the acid.

Fig. 27. A Wire Drawing Die.

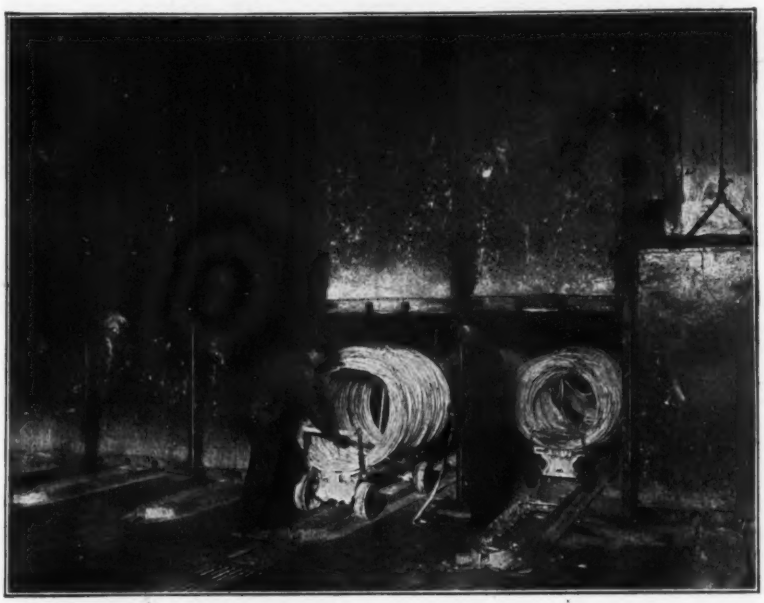


Fig. 26. Immense Ovens for Baking the Rods.

They are then put through what is called the sulling process, that is, they are lowered on the chain conveyor in Fig. 24 and run very slowly under successive sprays of water which in combination with the slight traces of acid still upon the rod and the exposure to the atmosphere, form a coat of a slightly greenish cast, which is technically known as the sull coat. This sull coat on the rod is said to be absolutely necessary in the cold drawing process.

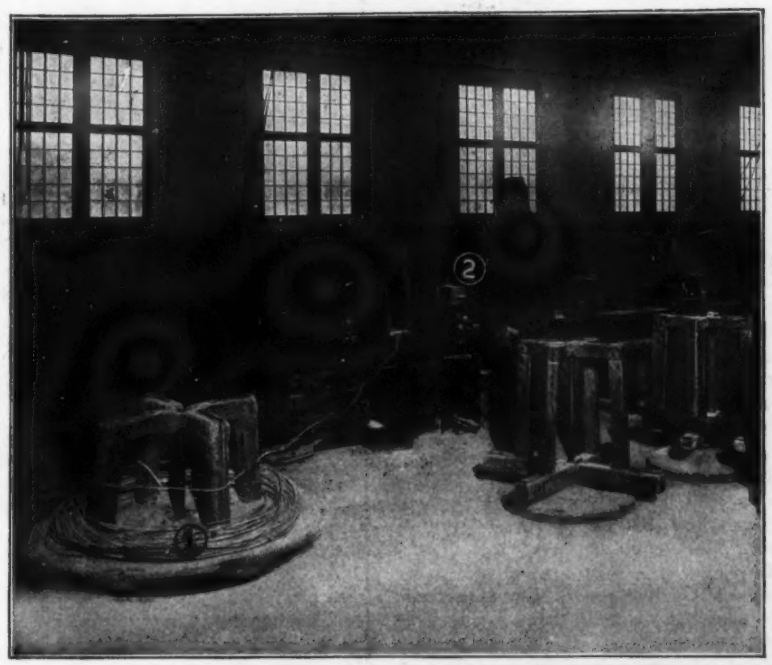


Fig. 28. Showing Actual Wire Drawing Operation.

Having received the sull coat, the rods are now dipped in milk of lime (Fig. 25) for a three-fold purpose. In the first place the lime being an alkaline substance, neutralizes any remaining traces of acid. In the second place, when this lime coat dries, giving the rods a whitewash appearance, it protects the rods from further atmospheric action, and lastly the lime being a slippery substance like talcum powder, it helps to lubricate the rod as it is drawn through the steel die.

The lime coated rods are now put in an oven, as shown in Fig. 27, and baked for several hours at a temperature of about 400 degrees, and are then transported to the wire drawing compartment. From this point on the wire drawing process is done while the rod is cold.

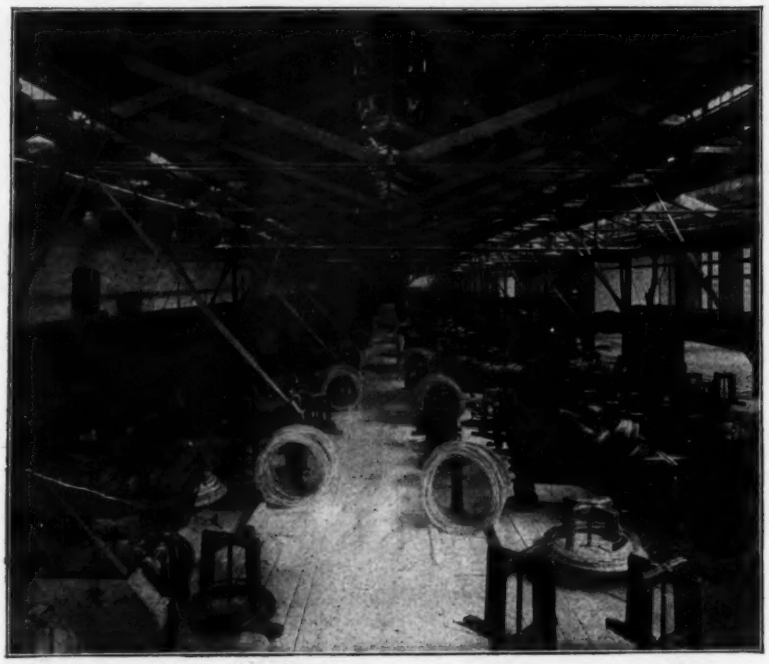


Fig. 29. General View of Rod Drawing Room.

Fig. 26 shows an enlarged view of a wire drawing die. The rod enters one of the larger holes in the die, and passes through, coming out the smaller hole on the other side. These holes are used one after another until worn too large to permit of accurate drawing.

A view of the actual wire drawing operation is given in Fig. 28. One of the dies in Fig. 27 is clamped in a vise just in front of the man who stands alongside of it. The spindle on the left (1) holds a bundle of the lime coated rods, and as the end of the rod is pulled through the die, it is fastened to a drum (2). This drum is now set in motion, and the entire length of rod is drawn through the die. The rod was not exactly round in shape and is somewhat crooked but after it is drawn through the die, and becomes wire, it is round, smooth, and without kinks. This drawing process continues, the wire being passed through one die after another, each one smaller than the one before until the required size for the specified wire, is reached.

A general view of what is called the rod drawing room is shown in Fig. 29. The light colored bundles are lime coated rods, the darker bundles upon trucks are bundles of wire that have been drawn one or more passes through the die.

As the dies become worn it is necessary to repair them. They are brought to the room shown in Fig. 30 and annealed, and the holes made smaller by hammering about them with a ballpene hammer. Some of the finished dies may be seen on the farther bench, which gives an idea of their size. After the holes are closed in this way, they are punched out to accurate size, and are then ready to use over again. With each draft of the wire through a smaller hole, however, the wire is not only made smaller in diameter and longer, but is made harder as well, because the metal is packed together more tightly as it passes through the die, and finally, if the drawing process were continued long enough, the wire would become quite brittle. It may, therefore, be necessary from time to time to anneal it.

Fig. 31 is merely a view of a room full of wire in process. Some of it is waiting to be drawn down to finer sizes, and some of it is probably ready to go to the galvanizing room. The beginning of the galvanizing process is shown in Fig. 32. The hard drawn wire is being uncoiled on the spindles and started towards the galvanizing pan.

(To be concluded.)

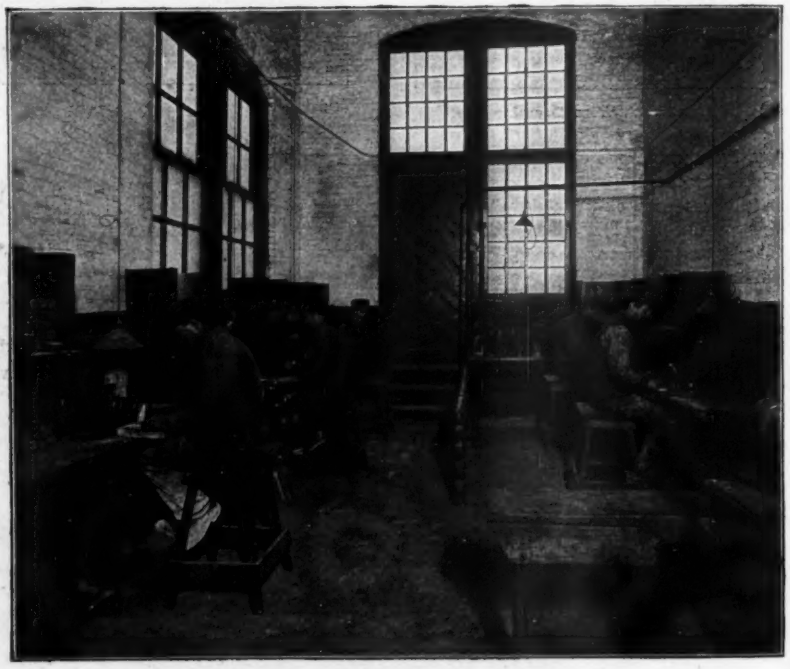


Fig. 30. Workmen Repairing Wire Drawing Dies.

Telephones on Chesapeake Bay Boats.

In an interesting article "Cheasapeake Bay Traffic" in The Transmitter, J. O. Martin describes the scenes at the municipal and private wharfs at Baltimore, Md., where all kinds of merchandise from toothpicks to grand pianos are received for shipment to Norfolk and other southern points. It is interesting, he says, to saunter along the Light street wharfs, watch the mule teams back up their loads, and

to see the stevedores passing freight or lolling in the sunshine. Along these wharfs there is a peculiar and not unpleasant odor about, that seems to come from nowhere in particular, an odor which probably emanates from the mass of tropical fruit, hard-shell crabs, varnish, and hemp rope. Buyers come to Baltimore in the morning, and the goods are shipped by the evening boat of the same day. On the trip from Norfolk to Baltimore, the boats carry raw cotton and other agricultural products, most of which are for export trade.

The principal street along these wharfs is Light street, now a wide and busy thoroughfare, but which formerly, before the Baltimore fire wiped out this section, was extremely narrow and always so choked with traffic that it required a skilled horseman or post graduate pedestrian to pick a way along through in those days. Now the mule has been superseded to considerable extent by the automobile truck.

Fig. 31. Wire in Process.

The telephone plays no small part in all the activity of the place. At the entrance to the wharfs, there is always found a telephone for the use of shippers. When a load of freight arrives for shipment and further information is necessary, the driver is allowed to call his employer at the expense of the steamboat company. The docks, buildings and offices are well supplied with telephone service, and public telephones are in evidence in the waiting rooms and at other convenient points.

The Chesapeake line is one of two lines that operate between Baltimore and Norfolk. This line has seven ships, two of which, the City of Annapolis and the City of Richmond, were launched at Sparrows Point a few weeks ago. These boats are equipped with private telephone systems, each boat having about 150 stations. There is also a public telephone and booth on board. When a ship ties up to the dock, the public telephone is connected with the switchboard in the company's office on the wharf by means of a cable and a plug and jack arrangement. Local service at both ends of the line is furnished free to patrons through the steamship company's switchboard.

Passengers arriving in the early morning at either Baltimore or Norfolk, are able to make arrangements and appointments for the whole day by telephone without leaving the boat. Many passengers also make their farewell calls by telephone just before the lines are cast off. The telephone system on board provides a telephone in every stateroom and in various other parts of the boat. All ships are provided with wireless apparatus.

The maritime department of the Baltimore chamber of commerce uses both telephone and telegraph in reporting incoming ships from foreign and coastwise ports. A ship is first sighted at Cape Henry, at the entrance to Chesapeake Bay, and the name of the vessel and the time of passing the point are telegraphed to Baltimore. Cape Henry is about 100 miles down the bay. She is next sighted at Cove Point, 50 miles nearer Baltimore. There is a telephone in the lighthouse at Cove Point, and the keeper utilizes it to forward the information. At Sparrows Point, ten miles from Baltimore, she is sighted by the observation station and reported to Baltimore for the last time.

The object of reporting these incoming vessels is to keep the members of the chamber of commerce posted on shipping matters. This information is available at all times.

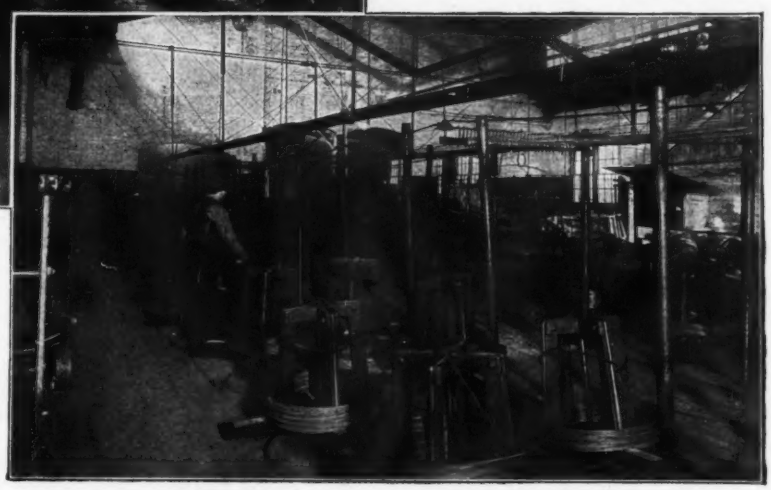


Fig. 32. First Step in Galvanizing Process.

Troubleman in the Wild and Wooly.

A recent dispatch from Kellogg, Idaho, reads as follows: A 22-caliber rifle was added to the usual equipment of a telephone lineman this afternoon to enable him to shoot off the insulators on a pole which was hanging over the river, suspeded alone by the wires. The lineman took a position near the pole and a dozen shots smashed the insulators, released the wires and saved the line from trouble.

Telephone Subscribers Use Boycott.

Telephone subscribers at Arkadelphia, Ark., to the number of 300, are reported to have discontinued the use of their telephones and declared a boycott against the Southwestern Telegraph & Telephone Co. Some time ago the town accepted an increase of 50 cents a month on residence telephones and $1 a month on business telephones, the company agreeing to install a new system. Now the citizens say the new system is not worth the increase in price.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

Vermont Investigators Charge Telephone Monopoly.

The investigating committee recently appointed by Governor Fletcher, of Vermont, to investigate the telephone business in the state has made report charging monopoly and domination of the telephone business in the state by the New England (Bell) Telephone & Telegraph Co., and recommending a 20 per cent. reduction in toll rates within the state.

"The business control by the New England Telephone & Telegraph Co., says the report, "is accomplished by means of the ownership of a majority of the stock in companies either organized or bought. The companies were created for the sole purpose of stamping out competition. Every company of importance is dominated by the New England company through so-called 'traffic' and 'purchasing' agreements. These agreements are full of prohibitory rules and regulations which the subordinate companies must observe if they want connections with the New England's lines."

The commission declares that all information that would be of any great value, so far as figures are concerned, is confined to the Boston office. It finds unfairness in the division of tolls and methods and manner of bookkeeping and a "covering up" for the purpose of showing a lack of profit in the business. The commission says that the New England company, having advised it to employ accountants to audit these companies' books, has refused and neglected to furnish them with important information, facts and figures and copies of contracts and documents requested. The commission recommends that the burden should rest on these public utilities to satisfy the commission that their rates, charges and business methods are fair, just and equitable.

In transmitting the report of the special commission to the Public Service Commission, Gov. Fletcher says:

"Conditions as described in the report of these gentlemen make it imperative for the state to obtain relief for its citizens, and I wish to express my belief that it is your duty to take such steps and issue such orders based upon a liberal and reasonable interpretation of your powers as will speedily relieve the state's rights to regulate and control these corporations."

The investigation was made by W. A. Graham, of Bellows Falls, and E. A. Cook, of Lyndon, Vt.

Refund to Oklahoma Subscribers Delayed by Court Order.

The Oklahoma supreme court has allowed the Pioneer Telephone & Telegraph Co. a supersedeas in its appeal from the order of the Oklahoma Corporation Commission requiring the company to refund to subscribers in Oklahoma City the sum of $62,057.27, representing the amount of the increase put into effect by the company without permission of the commission, from June 1, 1909, to December 31, 1912. The commission's order as issued required the money to be paid over by July 15, 1913.

The controversy arose out of the commission's order prohibiting rates to be raised without its permission. The Pioneer raised rates in Oklahoma City without regard to that order and was fined for contempt. The supreme court, on appeal, sustained the authority of the commission, both in regard to the original order and in the contempt proceedings. The matter has since been pending before the commission and several unsuccessful attempts have been made to secure an amicable settlement. The commission denied a rehearing and refused a supersedeas, but finally agreed to allow the matter to stand without further action until the supreme court should decide whether or not an appeal would lie from the commission's order.

Oklahoma Commission Orders Physical Connection.

The Oklahoma Corporation Commission has issued an order requiring the Pioneer (Bell) Telephone & Telegraph Co. and the Jefferson County Telephone Co. to make physical connections of their toll lines at Addington until a time when a final adjustment of a basis for the division of the tolls between the Independent line, which is a mutual company, and the Pioneer, can be agreed upon. The commission does not attempt to fix any basis for division of tolls, but merely orders that good service be given to subscribers in the town and on rural lines.

The complaining company alleged that after the installation of its exchange in Addington and a rural system, a contract was made with the Pioneer by which it was to receive 10 per cent. of all tolls; that on August 1, 1912, that contract was abandoned by agreement, and that from that time to April 25, 1913, it received 25 per cent. of the tolls. On the latter date it is charged that the defendant, without notice, disconnected its toll line and installed its own switchboard in the outskirts of the town.

Pennsylvania Utilities Bill.

The Pennsylvania legislature recently passed, shortly before adjournment, a public utilities bill effective on January 1, 1914, entitled "The Public Service Company Law," which establishes a new public service commission and abolishes the old railroad commission as of July 1, 1913, but allows the latter to dispose of pending railroad cases until the organization of the new commission on or before October 1, 1913.

The new commission will consist of a chairman at a salary of $10,500 and six members at salaries of $10,000, to be appointed by the governor with the consent and advice of the senate. The commission is provided with a secretary at $5,000, a counsel at $7,500, assistant counsel at $5,000, marshal at $2,000 and an investigator of accidents at $5,000. The attorney general will be, ex officio, the general counsel of the commission. The commission may employ experts, engineers, statisticians, accountants, inspectors, clerks, etc. The principal office of the commission will be at Harrisburg.

The new law provides for the regulation of public utility companies and this regulation extends to some degree to municipally owned utilities. The powers and duties of the commission are elaborately defined, says Electrical World, and in general cover the following: To inquire into and regulate service, rates, fares, tolls or charges, condition of plant, safety and convenience of patrons, and adequacy of facilities; hold hearings upon complaint or its own motion; order reasonable, safe, adequate and sufficient service, facilities and regulations, and reasonable maximum fares, rates, tolls and charges; upon notification of intended changes in service, rates or regulations to hold hearings and investigations and issue any order in relation thereto which the facts justify; to order reparation to patrons where an order of the commission has been disobeyed; to regulate the traffic arrangements of street railways; to enforce joint through routes, classifications, schedules, service and rates, and apportion the costs thereof and the revenues therefrom; to regulate railroad crossings and all matters involved therein.

It shall be the duty of the commission to establish and main-

tain standards of service; to require adequate service and facilities; to supervise the issuance of securities; to prescribe and enforce regulations respecting the keeping of records and accounts, and to examine the same as desired; to subpoena and examine witnesses, compel the production of books, papers and records, make physical examinations and valuations, and any related investigations; to determine the fair value of the property of every public service company, including consideration of original cost, security issues, earning capacity under rates fixed by statute, expenditures for obsolescence, reproduction cost, and going concern value; to make revaluations from time to time; and to determine amounts to be paid for franchise rights and privileges.

Every public service company may charge and collect reasonable tolls, rates, or fares; establish sliding scales after approval by the commission; adjust rates automatically in relation to dividends paid stockholders, upon approval of the commission; to participate as the commission may deem wise in the additional profits resulting from economies or improvements in service; to establish different classes of patrons or consumers upon any reasonable basis, such as nature of use, quantity used, time when demanded, bulk value, facilities of handling, etc.; require payment of charge in advance under reasonable conditions; establish reasonable minimum payments, and require deposits to secure future payments; make cash discounts for prompt payment, or impose penalties for failure to pay promptly; to make complaint to the commission in like manner and with equal effect as any consumer or patron; and to pay to any patron or customer a reasonable sum for any service directly or indirectly rendered.

No public service company may be incorporated or created, obtain, exercise or renew its charter rights or privileges except after obtaining in due formal manner from the commission a certificate of public conveniences and necessity; this applies as well to foreign public service companies and to consolidations or mergers within the state. It applies with equal force to municipalities desiring to acquire, construct or commence operating a public utility plant of the kind already operated by a company within the municipality, provided that this requirement shall not affect the right of a municipality to continue operating or to extend its plant when no private company is serving the same territory.

It shall be lawful for any company to issue securities only in the manner prescribed by statute, for money, labor done, or property actually received. Application to the commission may be made for a certificate of valuation to the effect that the provisions of law have been met. In the case of securities running for more than one year, every company shall file with the commission a certificate of notification, in the prescribed form, giving the total amount of issue, prior securities outstanding, details of the new issue, par value (in the case of stock), maturities, interest rate, and redemption. Such certificates shall be verified by affidavit of the fiscal head of the company. No act of the commission shall affect the validity of such issue.

Upon approval of the commission evidenced by a certificate of public convenience and necessity, and not otherwise, it shall be lawful for one railway to construct its tracks across another, or for one utility company to construct it facilities across those of another; and upon like approval to relocate or abolish such a crossing.

Attorney General of Wisconsin Renders an Opinion.

Attorney General Walter C. Owen, of Wisconsin, in compliance with a request from the Wisconsin Railroad Commission, has delivered an opinion in respect to the commission's authority to permit the issuance of stock by the Citizens' Telephone Co., of Eau Claire, for the purpose of installing a local telephone exchange for the furnishing of local service in Eau Claire, a matter which was opposed before the commission by the Wisconsin (Bell) Telephone Co. The opinion deals quite exhaustively with a local situation and advises against the granting of authority to issue stock for this purpose.

Eau Claire is a city of 18,000 people, which is served by a local exchange of the Wisconsin Telephone Co. which has a large number of subscribers. The Citizens Telephone Co. of Eau Claire originally had only 18 and now has only 28 local subscribers in the city. Intercommunication between these local subscribers is possible but has been rare and has taken place usually when the lines of the local exchange of the Bell system were busy. The local service of the Citizens Co. has thus been incidental to its principal service.

The Citizens Telephone Co. of Eau Claire was incorporated to acquire the property of the Chippewa County Telephone Co. which, in 1905, according to the statement of facts furnished the attorney general by the railroad commission, extended two lines from Chippewa Falls to Eau Claire to provide subscribers with communication between the two places, and with certain rural lines connected with the city's system outside of Eau Claire, and subsequently to serve as a terminal for the Tri-State company's toll system.

In his opinion the attorney general discusses the disputed points in part as follows:

"While, in my opinion, the number of local subscribers and the rate charged are not material as determining the character of service furnished in a legal sense, they are still very important indications of the character of the service which has been furnished. From these facts, it would appear that the local service must have been a very slight, if not insignificant, incident of the service furnished. That the local service was of slight, if any, consequence to the company must be inferred by the fact that it maintained a telephone exchange in this city of over 18,000 population for some eight years and extended its service to only 18 to 28 subscribers. From the standpoint of the subscriber it must be obvious that a local service which afforded him telephone connection with but 17 to 27 other subscribers in the city must have been a very slight, if not quite inconsequential, part of the consideration for which he paid at a rate of $36 per year.

"It is such," the opinion adds, "as to fall within the maxim that the law does not take account of trifles. To permit a general duplication of an existing local telephone exchange in a city of this size upon no more substantial compliance with the statutory requirement as to furnishing local telephone service would, in my opinion, be quite as subversive of the law's prohibition as to permit it in the absence of any pretense of compliance."

Complaints as to Bell Service in Adirondack Section.

Residents of Malone, in the northern part of the state of New York, are complaining of the service of the New York Telephone Co. since it acquired control of the various Independent lines in the Adirondack section. At a recent indignation meeting a committee was named to present to the Public Service Commission of New York a protest against the service. The committee is made up of members of the boards of trade at Malone, Saranac Lake, Chateguay, Potsdam, Port Covington, and Ogdensburg. Some of the business men are talking about building an Independent line.

Maine Utilities Act Must Await Referendum.

The public utilities act of Maine will not become operative at once on account of the fact that petitions have been filed with the secretary of state asking for a referendum on the measure. A vote may be taken in November of this year or later, providing the Governor calls a special election; otherwise the measure cannot be voted upon until September, 1914, when the regular general election takes place.

To Organize State Telephone Association in Missouri

Independent Telephone Men of State Take Initiative in a General Call for a Convention to be Held at Sedalia, Mo., August 20 and 21—Believe Time is Ripe for Compact Organization to Co-operate with State and Federal Commissions

The Independent telephone men of Missouri are busy making plans for a state convention to be held at Sedalia on August 20 and 21. The call issued has been signed by the leading telephone men of the state, with Houck McHenry, of Jefferson City, as president, and Ed. A. Hook, of Appleton City, as secretary. Missouri now has a public utilities law administered by a commission which henceforth will have jurisdiction over telephone companies, and the men interested in these companies believe that a strong compact organization is necessary at this time to enable them to meet the situation.

Houck McHenry.

The official call states the need for such an organization and is given in full below: "To the Telephone Owners and Managers of Missouri:

At a meeting held in Sedalia on July 15, 1913, composed of a number of telephone managers, it was agreed by those present that a state telephone association was an imperative need. In view of the changed conditions in the telephone business of Missouri, owing to the control over the industry given the Public Utilities Commission, and the further control vested in the Interstate Commerce Commission, it seems necessary that the telephone owners of the state should organize themselves into a compact working body. The purpose of this organization would not be to oppose the workings of either the Public Utilities Commission or the Interstate Commerce Commission, but rather to aid in enforcing the rulings of these commissions by co-operating in carrying out the provisions of the law, and in enabling the commission to establish fair, reasonable and adequate rates and fair and just rules and regulations.

Many questions are being asked the Public Utilities Commission that should be answered by a conference of telephone interests. Points of difference between telephone companis are being brought before the commission for adjustment that ought to be "ironed out" by the telephone companies themselves. No doubt a strict conformance to the rulings of the commission will result in placing the telephone business on a much stronger footing, provided those rulings are made after careful study by the commission of the conditions existing. But only by an organization can these conditions be adequately and accurately presented.

The handicap of the commission, the telephone companies, and the public today, is lack of information. An organization can compile the information and properly explain it to all three parties. Already the orders doing away with free service, discrimination in rates and difference in toll charges have done much towards causing the public to realize that the telephone companies have been at a disadvantage.

In order to comply with the bookkeeping regulations of the Interstate Commerce Commission and the probable adoption of the same regulations by the state commission, it is imperative that the telephone companies take some action to aid the small companies to comply with the regulations at the least expense.

The old Independent organization has seemingly dropped into a state of lethargy and is doing nothing toward helping conditions that now exist and will from time to time come up for an adjustment.

For these and other reasons it was thought best to call a convention immediately, to form the proper organization to harmonize all telephone interests within the state. This call is sent out to all telephone companies, regardless of toll line connections (whether Independent or Bell). Toll line companies and companies controlled by toll line companies are not included in the call, as it was thought best to let the question of admission of such companies be left to the convention for its decision.

The date set for the convention is August 20 and 21, 1913, at Terry Hotel, Sedalia, Mo. It will be a meeting on strictly business principles, without any set program. The utilities commission of the state will be asked to have one of its members present and to give us its position on telephone matters in general. The meeting will probably continue over to the day following. Come prepared to stay over if necessary and do your part.

You are in the telephone business, have your money invested in it and should make a special effort to be present and do your part in working out the many problems of the business in Missouri."

The foregoing call is signed by T. L. Plummer, Ava, Mo.; Joseph L. Minter, Otterville, Mo.; C. W. Boutin, Cape Girardeau, Mo.; G. W. Schweer, Windsor, Mo.; W. N. Wicks, Willow Springs, Mo.; E. C. Wolfers, Hopkins, Mo.; T. J. Buchanan, California, Mo.; R. A. Guthrie, Macon, Mo.; W. J. Gold, Clarksburg, Mo.; B. E. Goff, Warsaw, Mo.; W. F. Owen, Clinton; Houck McHenry, Jefferson City; Waldo Edwards, Bevier, Mo.; H. C. Todd, Maryville, Mo.; Henry Bohling, Cole Camp, Mo.; A. E. Wright, Cole Camp, Mo.; L. L. Richardson, Calhoun, Mo.; F. H. Thompson, Cameron, Mo.; J. B. Gooding, LaPlata, Mo.; Ed. A. Hook, Appleton City, Mo. Houck McHenry, president, Jefferson City, Mo.; Ed. A. Hook, secretary, Appleton City, Mo.

"If for any reason," the circular adds, "you are unable to attend the meeting, please write Ed. A. Hook, secretary, at Appleton City, expressing your ideas concerning the nature of the organization to be formed."

It is said that other states are contemplating the same move, believing that mutual benefits for the companies and the public, as represented by the local utilities commission, will follow such an organization.

Authorized to Issue Stock as Dividends.

The Public Service Commission of Ohio has authorized The Citizens Telephone Co., of Coshocton, Ohio, to issue its common capital stock of the par value of $575 and its three-year, 6 per cent. notes of the sum of $17,000, and to distribute them pro rata among its stockholders, as a dividend or return from their investment in the company in lieu of certain moneys heretofore expended from petitioner's income for the construction, extension and improvement of the property, which the stockholders might, otherwise, have so received.

Induction as Affecting Telephone and Telegraph Lines

Theory of Induction—Conditions Likely to Cause Trouble and Means for Preventing or Resisting Inductive Effects—Third Installment of Paper Presented at Annual Meeting of Association of Railway Telegraph Superintendents

By P. J. Howe

The method of operating a three phase system largely influences the amount of interference with neighboring lines. From the standpoint of inductive disturbances, the principal differences between the delta and the "Y" methods of operation may be described as follows:

On a system operating with "Y" transformers, the triple harmonics caused by the generator or transformers appear as single phase voltages between the line wires and neutral. Where the neutral is not grounded, this harmonic voltage may not appreciably affect other wires. But when the neutral is grounded, the triple frequency voltages appear as single phase voltages to ground and may induce heavy static disturbances in paralleling lines. Furthermore, this high frequency interference cannot be neutralized by transpositions in the power wires on account of all triple harmonics being in phase.

In a delta system the triple frequency currents are short circuited by the transformers themselves, and are therefore not liable to cause induction on neighboring lines. There is no neutral available when transformers are connected in delta. On a system operating with grounded neutral at the generating end, it is possible to so ground the neutral at the distant end that triple frequency currents will flow out over the line wires in parallel and return by ground. This condition will exist when the step-down transformers are operated with line side "Y" connected, neutral grounded, and low tension side delta connected. It would result in practically no static disturbances, but might cause magnetic induction instead.

When a ground occurs on one of the wires of a delta system, or a "Y" system having an ungrounded neutral, the potential of the other wires to ground will be raised to the full line voltage and static disturbances in other wires will be increased many times. A line failure on a system having a grounded neutral will also greatly increase the static disturbances, but not as much as when the neutral is ungrounded. It may, however, so disturb the magnetic balance of the circuit as to cause magnetic induction in paralleling systems.

As a result of the various conditions described above, delta transformers are always to be preferred where telephone or telegraph lines are operated in the near vicinity. The principal reasons for this are that they practically eliminate the triple frequency currents and voltages from the line and provide no neutral which can be grounded. Where "Y" connections must be used, an ungrounded neutral will, in general, result in less induction on paralleling low tension systems.

The single phase electric railway is operated with one terminal of the generator or transformer connected to the overhead trolley conductor and the other to the steel rails and earth. There is no conductor of opposite polarity carrying current in the opposite direction, as in the metallic single phase distribution systems, and hence no neutralization of the inductive effects on other wires. For this reason the large currents used in railway work induce very high potentials in paralleling telephone and telegraph wires, often amounting to hundreds of volts.

Most of the disturbances from single phase railways are due to electromagnetic induction. The magnitude of the induction depends to a large extent on the amount of current which leaves the track and returns through the earth. For this reason it is very important that the return rails be well bonded and maintained, so as to reduce the earth current to a minimum. Good bonding of rails will also tend to prevent direct leakage to other systems which work to ground in the exposed district.

Interference from single phase induction could be largely reduced by providing an arrangement of circuits which would carry the return current in conductors located close to the trolley and feeder wires. There have been various schemes suggested for this neutralization, but most of them are more or less objectionable to the railway people, either on account of increased expense for transformers and line conductors or on account of some sacrifice in reliability of operation. Some of the simplest or more promising schemes are described below.

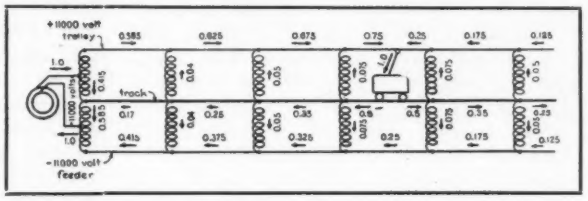


Fig. 9. Single Phase System With Auto-Transformers.

Where a telephone or telegraph line is exposed over a considerable distance, magnetic disturbances can be decreased by supplying current to the trolley at frequent intervals from transformers fed by a common high tension supply circuit. The decrease in induction would result from a car drawing current from two directions; that is, from the two nearest transformers. If a car is midway between any two substations, equal currents will flow in the trolley for equal distances but in opposite directions, with a consequent neutralization of inductive effects. If the car is nearer one substation than the other, a greater current will flow over the shorter distance, and the neutralization will still be effective.

A modification of the last described method consists of cutting the trolley circuit into short sections, each one fed by a transformer. Although this will limit the length of the sections causing interference, it will not provide the neutralizing effect for these sections. The latter can be obtained by using a transformer at each end of each trolley section, or what is its equivalent, one transformer with two secondary windings at each break in the trolley. If any effects from static induction are present, they can be largely neutralized by reversing the polarity of alternate sections of trolley.

One of the most promising schemes for restricting single phase railway induction, both static and magnetic, is an arrangement which is now being installed in the electrified zone of the New York, New Haven & Hartford Railroad, near New York city. As shown in Fig. 9, 11,000 volts will be used as heretofore, but the 11,000 volt power will be first stepped up by an auto-transformer to 22,000 volts. The middle point of this transformer will be connected to the track and earth. Of the outside terminals which now become + 11,000 and — 11,000 volts respectively, one will go to the trolleys and the other to auxiliary feeders.

At certain intervals auto-transformers will be connected between the trolleys, feeders and tracks, as shown. These transformers serve to so distribute the current taken by a car or

train that only a part of it will flow in the tracks beyond the adjacent transformers. In parts of the New Haven system, auto-transformers will be spaced approximately two miles apart; in other sections, where the load is less, a greater spacing will be used. The figures and arrows in Fig. 9 represent the approximate distribution of current in the various parts of a system such as illustrated. It will be seen that the currents in the trolley and feeder flow in opposite directions and will therefore considerably neutralize the magnetic induction on paralleling wires. The greatest disturbances will take place in the sections nearest to a car, for in this vicinity the trolley and feeder wires will be more unbalanced and the track current greater than elsewhere. A certain amount of neutralization will also be caused by the track currents flowing in opposite directions from a car. The arrangement described will practically neutralize all static induction, by reason of the trolleys and feeders having opposite and equal potentials to earth.

Although the auto-transformer system of single phase operation will not provide as complete neutralization of inductive effects as some of the other schemes mentioned, it has several points in its favor from the railroad point of view. It approximates a system having twice the trolley potential, with consequent economies in line copper. No wires, however, have a potential to ground greater than that of the trolley itself. The auto-transformers may be of relatively small size, as the load on a single transformer is never more than a small part of the total load taken by a car or train. A further advantage of this scheme is that it can be more easily and cheaply applied to existing systems than can other arrangements for neutralizing induction.

Harmonics and irregularities in disturbing circuits have been mentioned in several parts of this paper. In summarizing these conditions, it may be stated that harmonic currents are liable to exist in all types of alternating current systems. As their elimination or suppression will sometimes be the means of overcoming inductive interference, the following is given with a view to explaining how the presence of harmonics and their frequency may be determined, and to suggesting how they may be overcome.

The presence of harmonics and their approximate frequency can be determined by the tone or sound which the induced currents will produce in a telephone receiver. If there are a combination of noises present, however, it will be difficult to decide what is the predominant tone. The tone in the receiver depends on the frequency. Middle "C," on a piano-forte, corresponds to about 256 cycles per second. Ascending the scale, the next octave represents 512 cycles; the next, 1,024 cycles, etc. For descending tones, the first octave below middle "C" represents about 128 cycles; the next, 64, etc. Intermediate notes will have intermediate frequencies.

When investigating the frequency of inductive disturbances, the harmonics that would be expected are the third, fifth, possibly the seventh, and their multiples. For example, harmonics in 25 cycle systems might have frequencies of 75, 125, 175, 225, etc.; for 60 cycle systems the corresponding frequencies would be 180, 300, 420, 540, etc. If the tone from a disturbance is about the same as the note corresponding to one of these frequencies, it may be assumed that that harmonic is more or less prominent in the disturbing power circuit.

The elimination of harmonics from a power circuit is a problem for the power engineers. Where a power system will permit of it, short circuiting the harmonics at the generator or transformer will probably be the simplest method. A small capacity condenser, designed of course for the power voltages, should be satisfactory for this. A better arrangement, however, would be a circuit of inductance and capacity, adjusted for resonance at the frequency which it is desired to eliminate. An example of this method was described in a recent technical journal.* In this case, conditions in a telephone system, disturbed by a simple phase railway, were very considerably improved by short circuiting the railway generator with a resonance of 550 cycles, this being the predominant frequency of the disturbances. Whenever power harmonics are short circuited in this manner, it is of course necessary to guard against the creation of large harmonic currents which may be injurious to the generating plant.

Besides the short circuiting method of eliminating harmonics from line conductors, it may sometimes be possible to prevent the high frequency voltages by removing or altering the conditions which first cause their generation.

Restriction by Modification of Telephone Systems.

Inductive disturbances in telephone and telegraph systems cannot be entirely eliminated by modifications of those systems alone. Their complete prevention can only be brought about by removing the cause. When interference is slight, however, the serious effects can be more or less overcome by special apparatus or modifications of the low tension system, or by providing additional conductors. Theoretically, telephone circuits can be so balanced as to be operative under any exposure to inductive influences. The practical limit of satisfactory operation, on the other hand, is very soon reached when induction is present. In certain cases of magnetic induction, also, very considerable induced currents can be compensated for, but the neutralization is never complete and the procedure is, relatively, quite expensive. In the following are given the principal methods of modifying telephone or telegraph circuits, for the restriction of inductive disturbances.

Just as the insulation of a power circuit affects the inductive disturbances caused by it, so does the insulation of a telephone or telegraph circuit influence the magnitude of disturbances on it. In order to restrict the effects of power interference, it is first essential that the disturbed circuits be maintained with a high line insulation. In the case of grounded telegraph circuits, leakage may tend to impair the efficiency of any neutralizing devices which are used on the circuits. It is probable, also, that leakage may be a direct source of power disturbances, if the power lines happen to be at all low in insulation. Metallic telephone circuits exposed to inductive influences are especially sensitive to low insulation.

When a circuit is well insulated, it can be balanced by transpositions, so that the induction on the two sides will be alike, and practically none of the induced current will flow from one side to the other. When the wires become leaky, or one wire has a somewhat lower insulation than the other, the circuit becomes unbalanced and the induced currents in the two wires will no longer be equal. The result will be a strong current flowing between the two wires, and consequently a noisy telephone circuit.

For the reasons given above, the first procedure in attempting to overcome inductive disturbances should be to go over the line and remove all sources of low insulation, such as limbs of trees, strings or broken branches across the wires, broken insulators, etc. This applies not only to the exposed section of line but to all sections of the exposed circuits.

On account of having a ground return, telegraph circuits cannot be transposed against induction. In the case of telephone circuits exposed to induction, all regular transpositions should be checked up and any that have been omitted or incorrectly located should be corrected. If the ohmic resistances of the two sides of a circuit differ appreciably from each other, it will sometimes be necessary to locate and remove the sources of difference, such as bad joints and wires of a different size. After these procedures, the possibility of installing

*Elek. Zeit., Nov. 21, 1912, reviewed by Elec. World, Dec. 14, 1912.

special transpositions in the telephone circuit can be considered if the induction is still troublesome.

The principles to be observed in transposing telephone circuits are the same as those previously described with reference to transposing power circuits. The procedure is first to divide the exposed line into sections of as uniform exposure as possible, and then to install transpositions at the ½, ¼, ⅛,

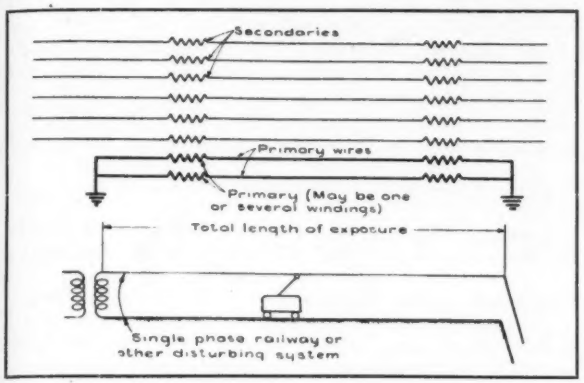

Secondaries
Primary wires
Primary (May be one or several windings)
Total length of exposure
Single phase railway or other disturbing system

Fig. 10. Compensating Transformer System.

etc., points of these sections. There should be no apparatus on or changes in either the telephone or power wires in the sections being transposed.

The ends of the transposition sections should be at points where either the parallelism changes, the power line is transposed, or the regular telephone crosstalk transpositions are located, or where apparatus, loops or taps are connected to either the telephone or power wires. The special transpositions need be installed only in those circuits which are most seriously affected by induction, unless these extra transpositions upset the crosstalk balance to the other circuits on the line. In such cases it will be necessary to transpose all other circuits at the same poles.

When the exposure of a telephone line to a power line extends over a considerable distance, better results can sometimes be obtained by an entire re-transposition of the line than by special transpositions described above. Instead of having regular crosstalk transposition poles located at the usual ¼ mile spacing, special short sections should be installed with the transposition poles spaced much closer together than usual. These sections should contain the regular crosstalk transpositions, and thus the crosstalk balance between the circuits will not be disturbed. At the same time, the transpositions on each circuit will be so much closer together than formerly that the effects of induction should be materially diminished.

Where very serious interference is encountered, the effects on telephone circuits can be greatly relieved by carrying the circuits in twisted pair wire or cable. The frequent transposition of the pairs will be very effective in balancing up the circuits, if the circuits are not elsewhere unbalanced by low insulation. It should always be borne in mind, however, that both cables and twisted pair wiring introduce a considerable transmission loss in telephone circuits, and are therefore undesirable unless the induction can be overcome in no other manner.

None of these procedures will eliminate the induced currents in the line wires. They merely tend to balance a circuit so that the inductive effects will be less serious. Where inductive effects are caused by electrostatic induction, it is possible to practically prevent the formation of induced currents by placing the wires in a cable having a grounded metallic sheath. This will shield both telephone and telegraph wires from static effects, but is objectionable on account of the resultant transmission losses mentioned above.

A number of investigators have suggested the installation of a grounded shield wire on a pole line, close to the telephone or telegraph wires. Although the writer has never seen any effectual neutralization brought about in this manner, the scheme is perhaps worth trying. Theoretically, a grounded wire should have some shielding action against static disturbances.

Electromagnetic induction can be only slightly neutralized by shielding. Even placing wires in lead sheathed, underground cable will not be effective in preventing magnetic disturbances, such as are caused by single phase electric railways.

When interference is caused by electromagnetic induction, it is possible to overcome much of the disturbance by compensating transformers, otherwise known as compensators. A compensator is a transformer having one or more primary windings, and as many secondary windings as there are wires to be compensated. The method of connecting compensators into telephone or telegraph wires is shown in Fig. 10.

One or more wires on the pole line, depending on the conductivity required, are connected through the primary windings and thence to ground at the ends of the exposure. The line wires which are to be compensated are run through the secondary windings. The voltage directly induced in the primary wires by a paralleling power or railway circuit causes current to flow through these wires to ground at each end of the exposure. This flow of current through the transformer primaries induces a voltage in each of the secondary windings. If, now, the transformers have the proper ratio of primary to secondary turns, and the secondary windings are connected in circuit so that their voltages will oppose the voltages directly induced in the line wires, the disturbance in the secondary wires will be practically neutralized and the induction overcome.

In practice, the ratio of primary to secondary turns is from 0.85 to 1, to 0.95 to 1, the slight difference being necessary to take care of the impedance drop in the line conductors. The efficiency of a compensating transformer system can be made as high as 75 per cent., and even somewhat higher, if the conductivity of the primary conductors is made high enough. The compensation will never be perfect, however, on account of varying load, varying line insulation, phase distortion and partial magnetization of the transformer cores by earth currents or by the direct currents used on telegraph circuits. Compensating systems also have the disadvantage of being very expensive, on account of the cost of compensators and the wires used for primary circuits, and of greatly increasing the maintenance cost of the circuits affected.

(To be concluded.)

Automatic System for Moline, Ill.

L. W. Stanton, general manager of the Tri-City Automatic Telephone Co., of Davenport, Iowa, states that material for the construction of a new automatic telephone system for Moline, Ill., is now on the way to that city and a force of men will begin the work of installing the plant as soon as the necessary material is on the ground. The preliminary engineering work and construction details have been completed.

The question of franchises in Davenport, Rock Island and Moline has been satisfactorily settled and it is the intention of the company to offer service to its patrons within the next year. The company contemplates laying 40 miles of cable in Moline, the entire system in the downtown section and in a large portion of the close-in territory to be laid underground. The trunk lines from Moline to Rock Island and East Moline will also be underground.

The telephone company has filed with the city commission of Moline a bond for $10,000 to indemnify the city in case of any loss resulting from the work of the company while disturbing the streets and alleys to install its conduits.

Practical Subjects—Letters and Discussions

Trouble Location in Magneto Exchange Without a Bridge.

By Wm. Hoover.

Locating trouble in the medium sized magneto exchange often becomes a perplexing problem to the superintendent, especially if a good bridge is not provided. The writer having to meet with these conditions, offers the results of some of his experience in locating the line trouble without a bridge.

The old proverb says, "Necessity is the mother of invention," So the live exchange man will devise some sort of testing apparatus, if not able to buy costly instruments.

After studying the matter, a cabinet maker was employed to construct a cabinet according to the writer's ideas. A complete telephone was wired within it, similar to those in the regular wire chief's desk. The material, purchased of a supply company, included the operator's head receiver, adjustable arm transmitter, etc.

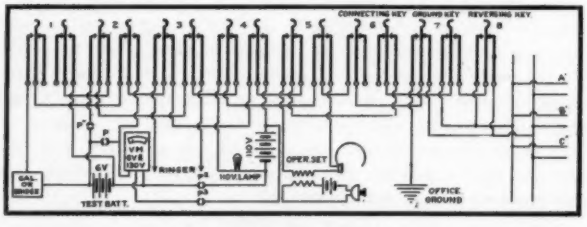
Next, a 32 c. p. 110-volt, carbon filament, lamp was wired in connection with three keys as shown in the accompanying drawing. Operating key No. 4 forms a metallic circuit through the lamp, the circuit terminating in a test plug mounted in the cord shelf. Operating key No. 7 tests one side of the line and operating keys Nos. 7 and 8 test to the other side of the line.

At the point P^{11} a substitution coil may be connected and at P^1 the plug is inserted to test the battery. The line A^1 represents the cords to the switchboard, B^1 the cords to the test panel, and C^1 the cords to the desk for testing coils, etc. The plugs for testing the main battery are inserted at P^2 and P^3.

This set was also supplied with a master key to switch from alternating to direct current so that it could serve for ringing as well as making rough tests. For example, if there were a cross near the exchange, upon operating the key No. 4, the lamp would glow brightly.

Grounds are detected by operating the keys, Nos. 7 and 8. The brightness of the lamp is inversely as the resistance of the line and distance of the trouble.

As the lamp furnishes only a preliminary test, a three read-



Wiring of the Testing Desk.

ing volt-ammeter, was purchased. The scales are 0-6.5 volts, 0-130 volts and 0.30 amperes. The instrument is a Pignolet continuous current type, especially adjustable for resistance measurements.

The 6.5 volt scale has 100 ohms resistance and each division of the voltmeter scale equals one milliampere. Thus it will be seen that two methods of measuring resistance are presented.

The first formula is, $R = \frac{v}{a} - r$, where v = voltage of testing battery, a = current in milliamperes and r = resistance of voltmeter coil.

For example, a short appeared on a certain line which showed on the instrument as follows: Shunting the battery alone 6 volts; shunting with the line in circuit, 13 milliamperes. Then from the formula $R = \frac{6}{.013} - 100 = 275$ ohms, and $\frac{275}{50 \times 2} = 2.75$ miles. In this, 50 is the number of ohms per wire mile, and dividing by two, gives the miles to the cross. On tracing out the trouble, it was found at the two and three-quarter mile point, as near as road measurements would make it. In the great majority of cases, the trouble will be found within a few pole lengths of where calculated.

High resistance crosses and joints will fool the best of people and make the best of instruments unreliable, unless measured from both ends and the average taken.

Another method of measuring resistance, using the 130 volt scale which has 2,000 ohms resistance, is the well known drop of potential method. The formula is: $R = \frac{r\,(V\text{-}V^1)}{V^1}$

Example: Shunting the battery, the voltage is 110; inserting the unknown resistance, the voltage is 80. Substituting these values in the formula, $R = \frac{2{,}000\ (110\text{-}80)}{80} = 750$ ohms.

This method is not quite as exact as the former, but it can be greatly increased in accuracy by the use of some known coil of about the resistance of the resistance to be measured. Then by proportion $E:E^1 :: r:x$ and $x = \frac{E^1 r}{E}$

Example: Resistance of known coil is 500 ohms and shunting voltmeter around it gives a reading of 60 volts. Shunting the voltmeter around the unknown resistance gives 80 volts. Then $x = \frac{80 \times 500}{60} = 666\ 2/3$ ohms.

Grounds may be measured by these same methods, but are more difficult to locate, owing to the resistance of the fault.

For example: A ground appeared on a line, and the following measurements were taken: Voltmeter shunting battery, 5.8 volts; shunting with unknown resistance, 11 milliamperes.

Then $R = \frac{\frac{V}{a} - r}{50 \times 2} = \frac{\frac{5.8}{.011} - 100}{100} = 4.27$ miles.

The ground was found where a subscriber had removed the carbon blocks from one side of the protector and replaced them, leaving out the mica, at a point a little beyond four miles. This fault was easy to locate as the ground was almost perfect.

Where the resistance of the ground must be considered, a little more elaborate testing is necessary, similar to the Varley loop test. Take, as an example, the resistance of a line from exchange to the fault plus the fault, equal to 250 ohms; resistance of line, through loop, from exchange to fault plus fault, equal to 390 ohms. The resistance of the loop to the fault plus the fault, added to the resistance from the exchange to the fault plus the fault, equals 640 ohms. That is $390 + 250 = 640$.

Supposing the line to be of No. 10 iron wire, 20 miles long, the resistance then is 400 ohms. Hence 640 ohms $-$ 400 ohms $=$ 240 ohms, which is twice the resistance of the fault. One-half of this is 120 ohms, being the true resistance of the fault, 250 ohms $-$ 120 ohms $=$ 130 ohms, being the resistance between exchange and fault. The distance to the fault is obtained from 130 ohms $\div$ 20 $=$ 6.5 miles.

There must, however, be one good wire the entire length of the line, so it can be tied at the distant end to the fault, forming the loop.

The keys regulating this instrument are the same as those in the lamp set. An extra pair of wires should be run up through the shelf of the desk, for testing coils, etc.

Another reliable way of testing, is by the use of the tangent galvanometer, which is used in measuring resistance, by substitution, as different currents, causing different deflections of the pointer are proportional to the tangent of the angle, not to the angles themselves. For example: With a constant current, a deflection of 30 degrees is obtained with the 10-ohm coil and the unknown resistance in the circuit. Remove the unknown resistance and unplug the 500-ohm coil and a deflection of 22 degrees is obtained. Consulting the table of the tangents, it is seen that 30 degrees is .577 and 22 degrees is .404.

Then as the currents are inversely proportional to the resistances

$$C : C^1 :: .577 : .404.$$
$$C : C^1 :: .510 : X + 10.$$
$$510 : X + 10 :: .577 : .404.$$
$$510 \times .404 = .577X + 5.77.$$
$$.577X = 206.04 - 5.77 = 200.27.$$
$$X = 347.1 \text{ ohms.}$$

Fresh batteries should be used with these tests, as their resistance is not calculated.

The Guying of Poles.

On page 38 of TELEPHONY, July 5, appears a letter in which the writer takes exception to a statement in an article in the June 21 issue, that to make the lead of an anchor more than two-thirds the length of the pole above the ground line is not economical.

The word economical does not exactly express the meaning the writer of the first article evidently desired to convey. But even so, Mr. Hawkins has failed to consider one of the main items of expense in locating anchors,—that of the cost of right-of-way. The farther into a field one goes, the greater the cost, as the writer knows from experience.

However, we will concede the point, but will state that instead of the words "not economical" the word "unnecessary" would have been more suitable. An anchor properly set the distance from the pole equal to two-thirds of the height of the pole above ground, allows a sufficient margin of safety over and above the breaking strain of either wire, or pins, and generally of the pole above the point where the guy is attached. A lead of 200 feet would not add any additional strength to either pins, wires, or the top of the pole.

Referring again to the cost of right-of-way, it is safe to state that to set anchors a few feet inside the property line on private right-of-way, perpetual rights, legally executed, will cost from $2 to $5 per anchor. To secure rights to set poles or anchors where they will interfere with the cultivation of a field will cost accordingly.

Chicago. P. H.

Corroded Joints Caused the Trouble.

We have a circuit of No. 10 iron running south a distance of 25 miles with three stations installed on it. The line taps at the Newnan, Ga., exchange. The last station south is five miles from Newnan. This line went open from Newnan back to the first station. I sent a lineman out to Newnan. He went to the test openers at the city limits of Newnan and tested but could not get Carrollton. The line was all right to the south of Newnan, so he drove along until he reached the first station and found nothing. He called in to Carrollton from the station but could not get the Newnan office.

I happened to think of a guano factory located about a mile from Newnan and as our line runs along close to it, I instructed him to start south, calling in every mile. Everything was all right until the lineman came to the guano factory. There he could get Newnan office to the south but could not raise Carrollton. He then went one pole north and could ring Carrollton. Thus he located the trouble in the span and, after taking down the line and remaking two joints, was able to call in either direction.

The trouble was caused from the acid fumes of the guano factory, but it seems peculiar as we have never had any trouble of this nature before this time. Since the trouble was cleared, we have had a similar case on another circuit on the same lead. In order to prevent further trouble we are going to string copper circuits by the factory and the connections with the iron part of the circuits will be soldered.

Carrollton, Ga. C. M. Hamrick.

Telephone Line as Weather Forecaster.

While acting as relief for the night operator recently, I overheard two women on one of my rural lines discussing the need of rain to the growing crops. One of them stated that there was sure to be rain soon, as there was considerable "cracking and popping" on the line. This being a grounded line, it is quite noisy as electrical storms approach.

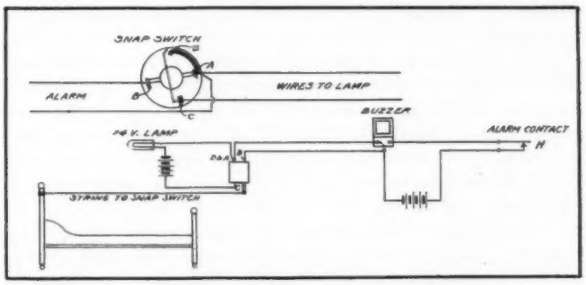
I have heard of telephones and telephone lines being used for various purposes in addition to what they were built for, but I believe this is the first time I have heard of its being used as a forecast of rain.

Glennsville, Ga. C. R. Sikes.

Idea for Night Operators in Small Exchanges.

The accompanying sketch shows an idea by use of which the night operator in a small office can, from his bed, grasp a string, and pulling it, break the night alarm circuit and automatically close the battery light circuit. When the call has been attended to, the operator gives the string another pull before lying down. This not only extinguishes the light but also restores the night alarm circuit.

In the diagram is the alarm contact on the switchboard and *A* and *B* are regular contacts original to the switch.



Arrangement of Alarm for Night Operator.

Contacts *C* and *D* are added and supplied by myself for the second circuit. I use lamp cord for the alarm circuit to avoid resistance and possible trouble.

This should be of interest to night operators in smaller exchanges where it is common to break a number of lamp chimneys and wake one's self up so thoroughly in getting the alarm stopped that it takes half an hour to go back to sleep. The more important feature of all is that the operator will never forget to turn on the night circuit when he goes back to bed. One set of dry cells that were of practically no use to me for other purposes has lasted six months. Figure it out.

Tipton, Okla. E. H. Hendricks.

For the Safety of the Public.

City Electrician Frank A. Baker, of Lansing, Mich., has issued a warning to the public against handling broken telephone of light wires after a storm. This, it is believed, with help in preventing many fatalities. Baker's warning contains the admonition to notify the police or the telephone or power company that competent linemen may be sent to care for the wires.

Railway Telephony—Practical Points in All Branches

A Regular Department Which Appears Semi-Monthly—Scope Includes Principles of Construction, Testing, Operation and Maintenance—Columns Open for Contributions on Matters of General Interest to Those Engaged in This Branch of Telephony

Transpositions in Telephone Train Dispatching Circuits.

By John A. Kick.

Telephone transposition systems are constructed from studies of the subject on a basis of a full telephone service. There are several existing standards which are effective when the wire lead is exclusively telephone but are not fully effective when high potential telegraph and printer circuits are carried on the same lead. Neither are they proof against inductive troubles from paralleling high tension circuits.

Standard transposition systems have been devised for a combination telephone and telegraph line, but owing to the irregularities in assignment of pin positions on such lines and the variable number of each class of circuit, these systems frequently require further modification. A telephone circuit transposed in accordance with these systems and paralleling one or more telegraph circuits on the same line, will be free from induction from the telegraph, provided there are no irregular conditions or other source of disturbing influence.

Induction from a telegraph circuit is usually an indication of an irregular telephone circuit condition, as the relatively low potential and low frequency of the telegraph circuit is not productive of trouble, either on the open wire line or in twisted pair cable.

Twisted pair cable is always necessary where telegraph and telephone circuits are to be included as the two classes of circuits through a telegraph straight cable will produce a noisy telephone circuit. The noise may be slight and considered negligible during the time the telephone circuit is clear and perfectly balanced, but may become so severe as to interrupt the service when the telephone circuit becomes "leaked" or otherwise unbalanced.

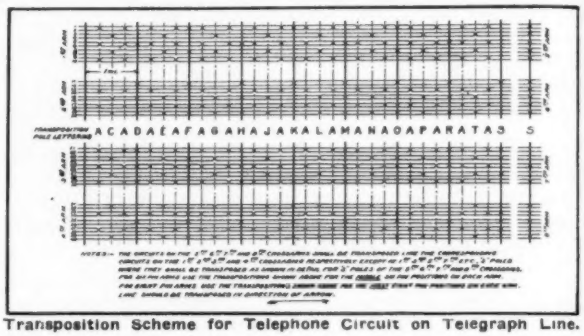
A scheme of transposing telephone circuits on telegraph lines which has been effectively and extensively used is shown in the illustration.

Transposition systems are not so designed that high tension induction is overcome in every case and it then becomes necessary to give special treatment to particular cases. One of the most effective treatments of inductive troubles from the three-phase high-tension line is a transposition scheme applied to the power line which, at one stroke, is effective to the entire telegraph and telephone lead.

The ablest telephone engineers have worked for years on the general subject of transpositions, including the complex condition produced by maximum phantom facilities to be derived. It is rather ill advised to entirely ignore the results of this extended research, as other than a systematic method of transposing eventually leads to a general rearrangement being necessary.

To follow the general standard scheme with modifications by adding multiples of the general system where necessary, places every circuit in condition to eventually be continuous in two given pin positions and transposed correctly. As it stands today, wires on railroad leads are rarely continuous in a given pin position from terminal to terminal. The latter construction and reconstruction is provided for finally arriving at a more desirable condition. To hasten and simplify the transformation, every new telephone circuit should be transposed in accordance with the pin position it occupies, so that when the time for cut-over arrives, the several disjointed sections will fit into place.

When high tension interference is encountered, retransposing should not be resorted to until an investigation is made of the offending circuit. Some of the smaller power plants at times continue to operate for extended



Transposition Scheme for Telephone Circuit on Telegraph Line.

periods with their transmission lines in poor physical condition and out of balance, causing severe disturbances on neighboring telephone and telegraph circuits.

Transposing a telephone circuit to overcome disturbances due to irregular conditions on adjacent power transmission lines, is a severe task, but, when the power lines are regular, the remedy is easily applied. In so doing, the standard transposition positions should be maintained if possible and the necessary additions made multiples thereof.

Transposing against disturbances from power lines which parallel the telephone line for one or two miles should not be limited to that section but should be extended beyond the high tension zone in both directions. The greater the number of other wires on the telephone lead, the longer the extension should be. To overcome a two-mile exposure, it may be found necessary to quadruple the transpositions in a four-mile section and, in addition, at least double the number in a two-mile, or even longer, section at each end of the four-mile section.

Almost every exposure is a study in itself and requires special treatment, as the charcteristics of the disturbing circuits are rarely similar owing to the presence of feeder wires and other circuits.

In constructing a dispatching or message circuit, the first circuit should be assigned to pin positions which will be adjacent to pin positions for a like circuit to be paired and transposed for a phantom. When the standard transposition scheme is followed on the first and second physical circuit, the phantom transpositions will be easily assigned by standard method.

Full Use of Wires.*

By H. D. Teed.

It is not my intention in this paper to go into a technical analysis of all the methods that can be employed in order to get full use of all classes of wires, nor will I attempt

*Paper presented at annual meeting of Railway Telegraph Superintendents.

to lay down any definite rules that should be followed, as all realize fully that such a paper would take up altogether too much valuable time.

There are doubtless, however, some of our members who are at times confronted with problems of taking care of ever increasing telegraph and telephone traffic, which would seem at the first glance to require an investment in additional wires. Often this is found to be absolutely necessary. Sometimes a careful study and intimate knowledge of the physical condition and relative position on the cross arms of present wires will offer a solution. Where present facilities cannot be utilized and additional wires are absolutely required, the ultimate use and possibilities of future additions and combinations that may be effectuated should in all cases be carefully considered.

Supervision of Circuits on Frisco Lines.

Perhaps a review of some of the steps that have been taken on the Frisco along these lines will be of interest. We have considered it of paramount importance to keep our circuits, no matter whether old or new, telegraph or telephone, in the best possible physical condition. It is the anatomy of the wire that we use, and if a part of that anatomy becomes impaired or defective, only by the intelligent use of such indispensable testing instruments as the volt meter, ammeter, and bridge can the defects be entirely eradicated. We have for the past seven years equipped our testing offices with these necessary instruments.

The next most important step is to secure the services of an energetic and resourceful young manager and wire chief and two assistants for each wire testing district, who realize the investment represented by the facilities over which they are to exercise supervision. Unless they are made to fully realize this and enter into the spirit of demonstrating their own ability to handle the large investment entrusted to their charge, it matters little what kind of a wire you have up, or put up. Even though the wire be flawless and erected with the greatest care, extraneous influences may develop defects, which, if not promptly located and removed, will greatly reduce the working efficiency of the wire. Incidentally, it is of equal importance that appropriate equipment be selected for any class of service. Often too little thought is given these essentials.

In 1908 the Frisco, like several other roads, awoke to the advantages and economies that could be worked out by the substitution of the telephone in train dispatching, and at the same time reasoned that if the telephone was a money-saver in expediting the movement of its trains, the same would apply to the handling of the message traffic, or better still, eliminate it to a great extent and incidentally reduce the great volume of correspondence with which all roads are more or less burdened.

A careful study of our line showed that we possessed an advantage over many of our neighbors. Starting at Springfield, where are located our principal operating department heads, our lines radiate in six directions, four of them being the heaviest traffc sections on the road. These we decided to equip with not only a telephone dispatching circuit, but a paralleling message circuit as well, and on these two circuits to superimpose a third, or so-called phantom, for through business between all the terminals, connecting with our private branch exchanges, making a complete and flexible system for not only train dispatching and message service but for intercommunication between our larger terminals, in a way rivaling that of the commercial companies. There had not, however, so far as we could learn, been an installation of this kind made previously. True, our telephone friends had utilized the phantom principle for several years on their toll lines, but their toll lines were not equipped with selectors operated by comparatively high voltage pulsating direct current.

Another seemingly serious obstacle to the carrying out of the plan was the necessity of cutting two of the longest and heaviest dispatching circuits in the middle to meet operating conditions, forcing us to make up one of the side lines of abutting circuits. Owing to lack of space we were obliged to place an additional cross arm over the entire 750 miles, on which we strung four No. 9 copper wires, transposing each circuit every half mile alternately, and placing a phantom transposition every two miles. The result was perfectly quiet side and phantom circuits before any selectors were applied. The cutting of the dispatching circuits necessitated the installation of some special equipment in the middle of the line and at the terminals by means of which we were enabled to maintain the quiet side lines and phantom.

The middle-of-the-line equipment, that is to say, the points where the abutting dispatching circuits are bridged together, consists, in addition to the regular master selector equipment, of four 1-m.f. condensers on the terminal of each wire on the respective dispatching circuits and two No. 39A repeating coils, the centers of the coils being connected together. The message circuit terminals are similarly connected through condensers, permitting the passage of voice currents. The impulse currents actuating the selectors are passed around the condensers by utilizing a 3,500-ohm relay, the local points opening and closing the intermediate main battery.

The terminal equipment consists of eight 1-m.f. condensers, two in multiple, on each wire, and two No. 39A repeating coils tapped in the center and carried to the P. B. X. board jack. A No.43J bell is bridged across the tap, providing a means of signalling between the exchanges on the phantom, the standard signaling current at the P. B. X. boards being sufficient to ring through. The dispatching and message circuits are also cut into the P. B. X. boards, but no connections are permitted on the former.

The signaling on all the message circuits is done by the monitor operators, who are all located in the main P. B. X. operating room at Springfield, and they are on the lines all the time during the day. At night the signals, actuated by generators at all stations, are switched across the line and attract the monitor operator's attention. The monitor operator's board is provided with trunks to the various auxiliary private branch exchanges. The through calls on the phantom are handled by the P. B. X. operator; likewise, calls from the phantom to sub-stations off her board. A phantom call for a station on any message circuit is trunked to the monitor operator, who signals the station desired. The system is, therefore, flexible.

Three Circuits Out of Four Wires At Small Cost.

The phantom represents, in effect, an investment of approximately $143,000, or the cost on the poles of two No. 6 B. & S. gage copper wires 1,500 miles long, yet this circuit cost the Frisco Railroad less than $800 and gives three circuits out of four wires.

We have not attempted to utilize these wires for telegraph service, as the release of the telegraph dispatching circuit and the local Morse circuit on all the territory referred to, gave us two additional iron wires which are used for through business. All local business is now handled telephonically.

Very satisfactory and economical telephone service is obtained from the use of composite or telegraphone instruments operated on Morse circuits when confined to short

distances. The Frisco has, in quite a number of instances, avoided opening telegraph offices by connecting a telegraph office with a non-telegraph office by means of these instruments, permitting the non-telegraph office to obtain all necessary information regarding trains, orders for cars, etc. An installation of this kind costs so little, however, that it is difficult to overcome the inclination to attempt to operate them a greater distance than they can reasonably be expected to work.

On a portion of the line 90 miles long where we have a metallic manual block made up of two No. 8 iron wires transposed every half mile, a condition arose almost over night necessitating an additional local message Morse circuit.

Each station had two telephones, one used for blocking in each direction. By connecting the centers of the ringing coils in series with the telegraph switchboard at each station, and the centers of the terminal coils with battery a simplex circuit was obtained and placed in service on the second day. No additional apparatus excepting the Morse instruments was used.

I have purposely omitted any reference to the duplex and quadruplex, as anything I might say would be a repetition.

There will be within the next few years, no doubt, apparatus developed and combinations worked out that will result in still greater use of wires.

Statistics of the Wire Industry in 1909.

Statistics for the wire industry in the United States for 1909 are presented in detail in a bulletin soon to be issued by Director Harris of the bureau of the census, department of commerce. It was prepared under the suprvision of Wm. M. Stuart, chief statistician for manufacturers.

The manufacture of wire in the United States is carried on by three classes of establishments: (1) Establishments whose principal business is the drawing of wire from rods which are either purchased or transferred from independently operated rolling mills of the company, thus including the detached and independently operate wire mills of companies rolling the wire rods; (2) establishments that roll iron and steel, copper or other metals or alloys, and maintain wire-drawing departments supplied with rods from the co-operating rolling mills; and (3) establishments whose principal business is the manufacture of some quite different product, but which incidentally draw some wire, usually as material for their own consumption. There are many establishments which draw no wire, but which manufacture wire goods (fencing, wire cloth, springs, etc.) from purchased wire. Such establishments are not covered by the census statistics for the wire industry.

The total number of establishments in the United States in the wire industry as a whole in 1909 was 93, of which 56 were wire-drawing mills proper which purchased the wire rods used, 31 were wire departments of rolling mills, and six were wire departments of other concerns. The total value of the products of these 93 mills or wire departments was $180,083,522, of which $173,349,614 consisted of wire and products derived therefrom. Of this latter amount, 45.7 per cent. represented the value of products of the wire mills and 50.8 per cent. that of the wire departments of rolling mills.

Data regarding the wire industry as an entirety are not available for 1904 and 1899, but an approximate idea of its growth may be gained from the statistics of the production of wire rods of iron and steel. The output of such wire rods in 1899 was 916,587 long tons; in 1904, 1,792,704 long tons, and in 1909, 2,295,279 long tons, the increase for the decade being 150.4 per cent.

The large plants predominate, especially among the wire departments of rolling mills. The 24 wire departments of rolling mills whose product exceeded $1,000,000 in value together contributed $89,407,015, or almost one-half, of the total of products of the industry. Of the 93 establishments in the industry in 1909, 59 drew iron and steel wire exclusively, seven drew copper wire exclusively, six drew wire from materials (chiefly brass) other than iron and steel or copper, while 21 drew wire from two or more of the metals. A large proportion of the establishments manufactured wire nails, barbed wire, woven wire, and other products for which plain wire is the principal material.

Of the total expenses reported by wire mills in 1909, salaries represented 2.8 per cent.; wages, 13.3 per cent.; cost of materials, 78.2 per cent.; and miscellaneous expenses, 5.7 per cent. The cost of materials in 1909 represented 71.7 per cent. of the total value of products, and the value added by manufacture 28.3 per cent.

The total number of persons engaged in wire mills in 1909 (not including the wire departments of rolling mills) was 19,945, of whom 18,084, or 90.7 per cent., were wage earners. The fluctuations in number of wage earners were comparatively small. The month of minimum employment was April, when the number reported was 87.2 per cent. of the maximum number, which was reported for December. The increase from April to December apparently reflects the general improvement in business conditions which took place during that year. There is a marked uniformity in the hours of labor prevailing in the wire industry. Of the 18,084 wage earners in 1909, 7,626, or 42.2 per cent., were in establishments where the prevailing hours were between 54 and 60 per week; 10,232, or 56.6 per cent., in establishments where they were 60 per week; and only 1.2 per cent in establishments where they were 54 or less or more than 60 per week. For the industry as a whole the ranking states in 1909 were Pennsylvania, New Jersey, Illinois, Massachusetts, Ohio, and New York.

Establishments operated under corporate ownership dominate the industry. Of the establishments under individual and firm ownership in 1909, three were owned by individuals and four by firms. In 1909 establishments with a product valued at $1,000,000 or more constituted 44 per cent. of the total number of establishments, and produced 88 per cent. of the total value of products.

Of the total quantity of steel rods used in 1909, 54.1 per cent. were of open-hearth steel and 45.7 per cent. of Bessemer steel, only three-tenths of 1 per cent. being of crucible and other steel. In wire mills using purchased rods the consumption of Bessemer steel rods largely exceeded that of open-hearth steel rods, while in wire departments of rolling mills and other concerns the consumption of open-hearth steel rods, chiefly basic, was nearly twice that of Bessemer steel rods.

Of the total cost of wire rods used by the industry as a whole, 60 per cent. represented the cost of iron and steel rods, 36.3 per cent. that of copper rods, and 3.8 per cent. that of rods of other metals or alloys.

The wire departments of rolling mills and other concerns produced 66.7 per cent. of the total tonnage of steel and iron wire and wire goods reported in 1909, and 94 per cent. of the tonnage of wire and wire products of brass and other metals, (except copper or alloys) but produced only 33.5 per cent. of the product from copper.

The manufacture of insulated wire and cable to the value of $9,806,989 was reported by the establishments in the wire industry in 1909. Most insulated wire is made by establishments in the industry designated as "electrical machinery, apparatus, and supplies." The total value of the insulated wire and cable manufactured in 1909 was $51,624,737.

In the production of steel and iron wire, Pennsylvania led in 1909 with 851,448 tons, or 35.6 per cent. of the total amount drawn. In the production of copper wire New Jersey led with 63,452 tons, or 43.1 per cent. of the total; and in the manufacture of wire from brass and other metals or alloys Connecticut was far in advance of any other state, producing 32,304,963 pounds, or 92.8 per cent. of the total output.

In the Rural Line Districts

The Grandview Telephone Co. have moved their switchboard into the new office on West Main street. Chas. Frack, of Muscatine, had charge of moving the board and wires.—Muscatine (Ia.) Journal.

The Farmers' Telephone Co. has shipped in two carloads of telephone poles which have been distributed around the country.—Marshall (Mo.) Index.

Telephone connections have been made with Wiggins, which makes it very convenient to be able to speak with the outside world.—Hoyt Item, Ft. Morgan (Colo.) Times.

The telephone line from Stringtown to Daisy is almost complete and everybody is rejoicing over it.—Redden Item, Atoka (Okla.) Democrat.

The Sidell Telephone Co., has purchased a new switch board.—Bloomington (Ill.) Pantagraph.

R. B. Harrison put in a new cable for the West Side Telephone Co. last Tuesday. It just put all phones out of commission for about six hours, but they work better then ever now.—West Side (Ia.) Journal.

The telephone switch board has been removed from the Wesner residence where it has been for several years, the the home of Mary Daringder. Mrs. Daringder is now the operator.—Tracy News Bussey (Ia.) Record.

The Telephone Co. met at the Lake View School house Tuesday evening to do business with the telephone Co.—Logan Item, Woonsocket (S. D.) News.

The Lyman Telephone Co. expect to go into new quarters soon. They are to occupy T. Murphy's barber shop and he is to erect a brick building in its stead.—Paxton (Ill.) Reporter.

Some of the new telephone enthusiasts say Mr. Joslyn is troubled with softening of the heart, which readily accounts for some of the maneuvers in telephone circles the past week. Toll has been taken off from all connections hereabouts with the exception of Sycamore.—Hinckley (Ill.) Review.

The linemen of the Bell phone are making general repairs on their lines. They found their horse dead Friday morning when they went to feed it.—Mendota News, Earlville (Ill.) Leader.

The Farnsworth Telephone Co. have made quite an improvement on their line running through this Township, they cut out the central at Ennos Alley and built the line into Forestburg. They are putting in a plug board at Halvor Olesons.—Silver Creek Item, Woonsocket (S. D.) News.

The city council has been trying to locate the franchise granted the new Ottawa telephone company in 1898. This franchise has either been lost or was never recorded. A copy, as published in one of the newspapers of this city, shows the franchise does not allow the company to raise its rates, which the company did about a year ago.—Port Clinton Dispatch, Toledo (O.) Blade.

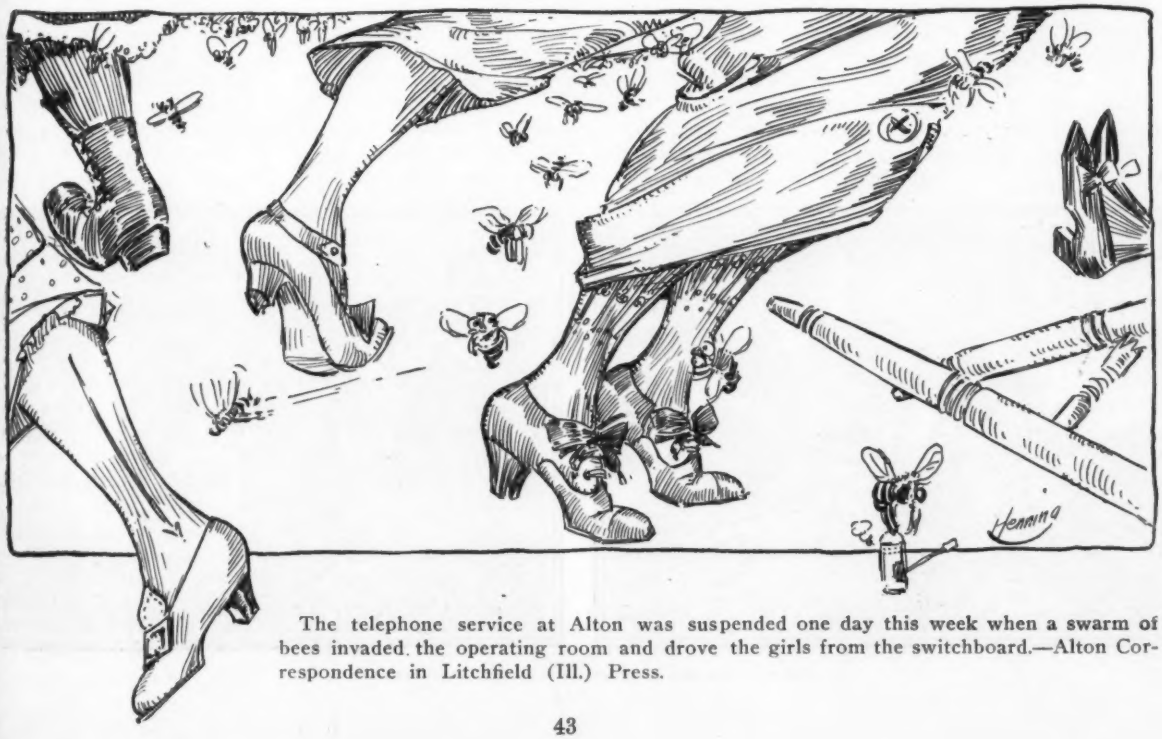
J. C. Peterson was in this vicinity Tuesday to get subscribers for a new telephone line. Nine agreed to take phones and a new line will soon be built, probably from Olin's corner to central.—Richfield Correspondence, Marshfield (Wis.) Herald.

The telephone office formerly located in the post office was moved into the Conners building the past week and now when ringing Seaforth the pleasant voice of Mrs. Conners greets you with a cheerful "hello."—Seaforth News, Redwood Falls (Minn.) Gazette.

The officials of the Rapatee and Maquon Farmers Telephone lines have purchased some good cedar poles, and are going to fix up the lines.—Repatee Item, London Mills (Ill.) Times.

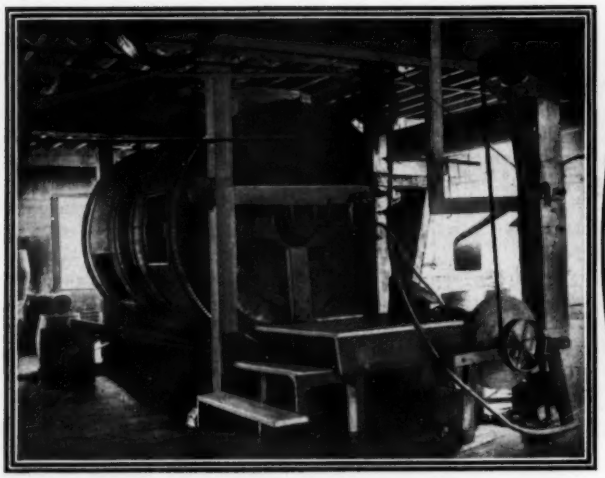
The new telephone switchboard arrived last week and has been installed. The office of the company is in the Gobble building on First street.—Fairfield (Ia.) Ledger.

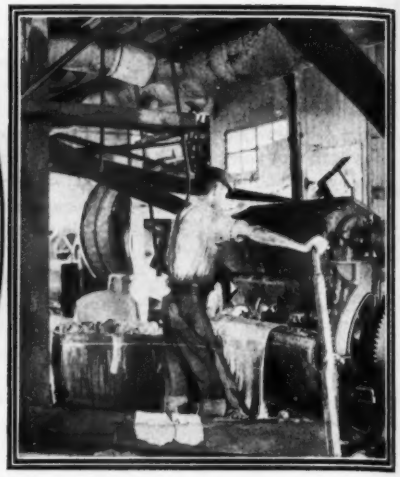
The Solon Telephone Co. has purchased a new switchboard, for the improvement of the local telephone service.—Solon Item, Mt. Vernon (Ia.) Hawk-Eye.



The telephone service at Alton was suspended one day this week when a swarm of bees invaded the operating room and drove the girls from the switchboard.—Alton Correspondence in Litchfield (Ill.) Press.

From Factory and Salesroom





Drums in Which Skins Are Washed—Removing Fine Hairs With Knife—Fleshing Machine.

"Rezistol" Gloves for Linemen's Use.

The Morrison-Ricker Mfg. Co., whose home has been at Grinnell, Iowa, for over 50 years, could hardly be better situated for the manufacturing of its gloves, which are used in many branches of work, and whose linemen's glove is of special interest to the telephone field. To the southwest of Grinnell, Iowa, is the principal hide producing region in the United States. This is an advantage as far as freight charges on new materials are concerned. Furthermore, Grinnell, Iowa, has a fortunate geographical location from a distribution standpoint, since it is almost at the center of the United States. This gives the company an economic advantage in manufacturing and selling.

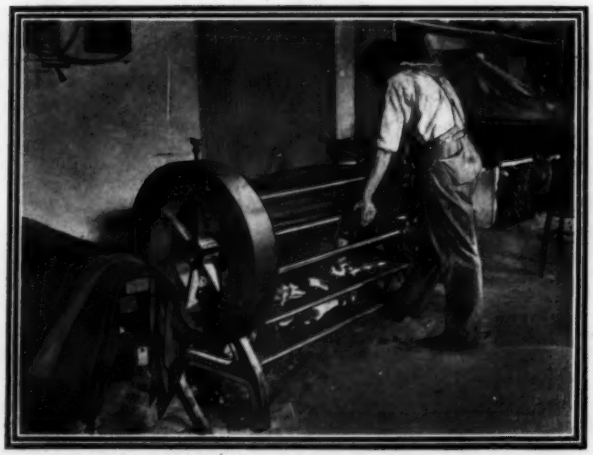
The company believes in a liberal use of "printers ink" in making known the merits of its extensive line of gloves—from a glove for the discriminating few or "fastidious," to a suitable and satisfactory glove for the workman, and gloves for all demands and all climates. This is the reason attributed for a demand for the various varieties of its gloves which has become nation-wide. In order to satisfy this demand it was found necessary to build a leather glove manufacturing plant, a plant which is said to be one of the largest and most modernly equipped in the United States.

Accompanying illustrations give a partial idea of some of the departments constituting the factory, but do not give any accurate interpretation of "the spirit of thoroughness" which animates the employes of the company.

The demand for its gloves has made it necessary to operate a glove tannery, wherein exclusive processes in the tannage and finishing of its leather are employed. These are conducive to a finished product possessing the utmost strength and serviceability. Almost every process is accomplished by machinery under the direct supervision of skilled help, from the first trip of the hide to the "soak" until it is delivered as a finished product. Visits to the warehouse rooms, where as many as 6,000 horse hides are received in one shipment at a time, to the drums for washing skins, the paddle wheels, staking machine, the fleshing machine, the cutting machine, sewing tables, laying off or finishing, inspection and banding departments, disclose interesting and highly developed operations.

To prevent the seams of the glove from causing irritation to the wearer, these are carefully smoothed out, in the "laying off" process, where the gloves are pressed into shape over steam heated brass forms.

The finished glove is soft and pliable and gloves for summer use are made cool and comfortable by a ventilated back. It is declared that the leather will not scale, scuff or peel and whenever it assumes a soiled appearance can be made to look like new, as it can be washed with soap and water or cleaned in gasoline. Another reason, it is said, that linemen like this



Evening Up the Leather—A Leather Stock Room.

glove, is that it never "pinches," but always has a roomy feeling. The thumb of a glove frequently does not fit well, but it is claimed that in the Rezistol glove the thumb fits as comfortably as any other finger of the glove. The deep cuffs keep out dust, dirt, and snow in winter time. When desired these gloves are warmly lined for winter's work. The "Rist Fit" prevents slipping; and the cuff is held at the wrist without sagging. Being re-inforced at the wrist with an extra patch of Rezistol leather on the cuff, the wrists are adequately protected and wear is lengthened.

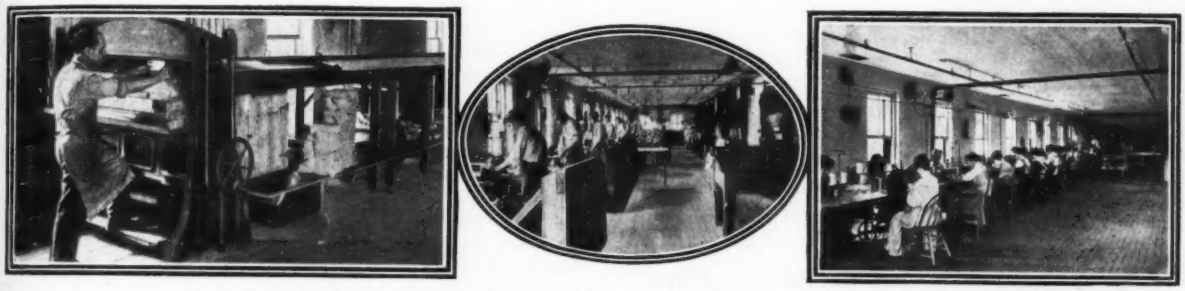
Experiments made by a prominent Chicago engineer disclose that Rezistol gloves have a high degree of resistance to electrical current. Insulation resistance tests were made on each sample of leather by placing it between two flat brass terminals one inch in diameter, with a weight of 1.5 lbs. on the top terminal. These measurements were first made with the leather dry and later were repeated after placing one drop of water on the finished side of the sample and spreading it over an area equal to the one-inch terminal. The measurements were made ten minutes after the water was applied. Rezistol leather, both dry and wet, showed an insulation resistance of more than 1,000 megohms, while other grades of glove leather tested showed from 800 dry, down to only 90 meghoms, wet. Breakdown tests were made on all of the samples when dry and using the same terminals as for the insulation resistance tests. Rezistol leather withstood breakdown voltage exceeding 4,000 volts while other samples tested withstood approximately only one-half the voltage.

These tests apparently indicate that the leather comprising the glove is "absolutely safe" for work of a hazardous nature.

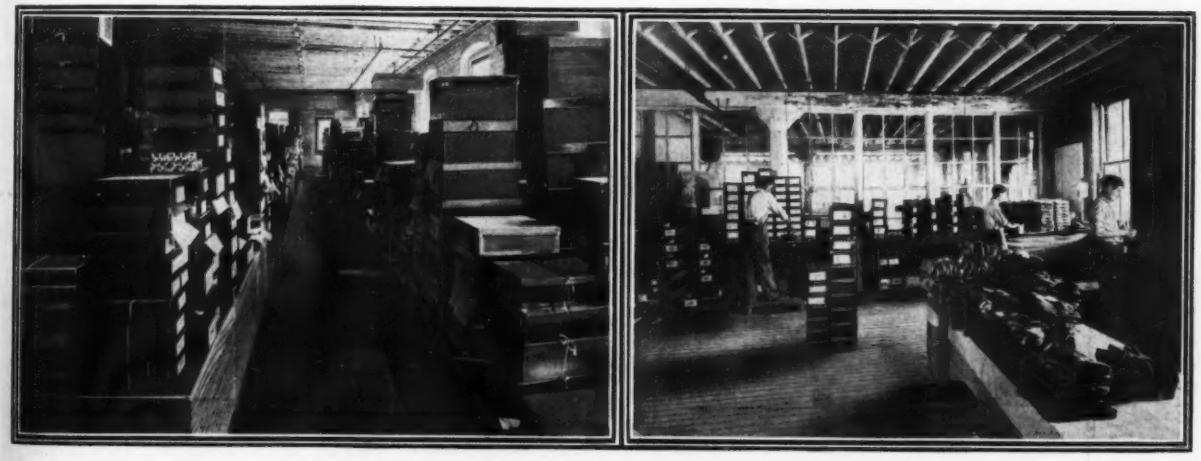
While these gloves cost a little more than the ordinary kind of leather gloves, the company says their higher prices are justifiable, as they out-wear two to three pairs of the regular work gloves.

Recognizing that the highest state of efficiency can only be derived by carefully considering the welfare of its employes, the company has a factory which is light, clean and well ventilated and provided with sanitary drinking fountains. Rest rooms are also provided at the company's factory, 133 Broad street, Grinnell, Iowa, for the convenience and comfort of its employes.

Laying Off, or Finishing, Room.



Cutting Linings on Power Machine—View in a Cutting Room—One of the Sewing Tables.



Scene in the Stock Room—Inspecting and Banding Department.

Halowax Oil and Halowax.

The Condensite Co. of America, of Glen Ridge, N. J., has just issued a pamphlet devoted to "Halowaxes," which is a term used to designate the synthetic oil and waxes developed by J. W. Aylsworth, the inventor of Condensite, who for 25 years was associated with Thomas A. Edison in

research work. Mr. Aylsworth devised a method by which chlorine can be permanently combined in the molecule, and the resulting products known as Halowax Oil and Halowax are now for the first time made available.

These substances are chlorine substitution products having the unique properties of non-inflammability, high boiling points, and a wide range of melting points. The Halowax oil remains fluid at very low temperatures, and is heavier than water. The others are waxlike substances, some highly crystalline and others nearly amorphous. They have faint aromatic odor.

Halowax oil may be used among other things for oil insulation for electrical apparatus, for which it is adapted because of its specific gravity, low viscosity, difficult inflammability, dielectric strength and low congealing point. For electric wires and cables the addition of Halowax to rubber will, it is stated, minimize the inflammability of the insulation and make the rubber strongly and permanently adhere to the wire.

E. J. Dean with Stromberg-Carlson in Texas.

Many of the friends of E. J. Dean and A. B. Crawford of the Stromberg-Carlson Telephone Mfg. Co., were doubtless surprised upon looking over last week's issue of TELEPHONY, to learn that these gentlemen had apparently changed names. This was due, however, to a mistake of the printers when putting the names under the cuts. Those acquainted with Messrs. Dean and Crawford, however, quickly recognized "who was who," but this correction is made for the benefit of those who may not yet be acquainted with these active members of the Stromberg-Carlson staff. Mr. Dean, as stated last week, will represent the Stromberg-Carlson organization in Texas and Mr. Crawford will cover his old territory in Ohio and West Virginia.

Annual Outing of Stromberg-Carlson Employes.

The eighth annual outing of the employes of the Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., was held recently at Manitou, on Lake Ontario. In addition to the general good time, the executive committee had arranged, and published a printed program, for some 15 athletic events for ladies, men and little tots, with prizes for the winners. There was also an indoor baseball game in the morning, the factory vs. the office force, and an outdor baseball game in the afternoon, the married men vs. the single men. Coffee and sandwiches were served at noon and orangeade during the day. Dancing and other amusements were also enjoyed.

Folder Showing Glass Insulators.

A mailing folder showing 43 designs of glass insulators has been sent us by the Brookfield Glass Co., New York City. Many of the designs are new. The folder will appeal to anyone who uses insulators. A free copy will be mailed on request to the Brookfield Glass Co.

Paragraphs.

W. N. MATTHEWS & BROTHER, St. Louis, Mo., have issued an attractive page reproducing an article on "Difficult Problems in the Anchoring of Poles" with illustrations as published in TELEPHONY on May 10.

THE M. W. DUNTON Co., of Providence, R. I., announces that it has again outgrown its accommodations and has placed a contract for another building which will be devoted to its general offices.

R. S. MUELLER, 423-425 High Avenue, S. E., Cleveland, Ohio, has issued his Cleveland stock sheet showing magnet wire in Cleveland stock on July 18, 1913.

Book Review.

AMERICAN TELEGRAPH PRACTICE, a Complete Technical Course in Modern Telegraphy, including Simultaneous Telegraphy and Telephony, by Donald McNicol. Published by McGraw-Hill Book Co., New York; 507 pages with 421 illustrations; price, $4.

The book takes up the subject of telegraphy in a logical manner. The text is based upon a series of lectures given in the evening technical schools in connection with Columbia University, New York. While mathematical formulas are regarded as being incomprehensible by those who have not had the benefits of a high school education, it is stated that the mathematics used in the book may be mastered without difficulty by the average student of telegraphy.

The subject is dealt with by first taking up the theory of electricity and magnetism, giving definitions, units and symbols ordinarily encountered in telegraphy. A discussion of primary batteries follows with an explanation of their general action, and many pointers are given as to the maintenance of the various types.

The subject of dynamo electric machines, such as are found in telegraph offices, is treated with great care. The factors which enter into the design and construction, dynamos, motor and motor-generator sets, are explained in a lucid manner, and descriptions are given of their accessories, such as starting boxes, overload and underload rheostats, fuses, etc. A chapter on power board writing for telegraph offices is followed by an interesting and instructive chapter on circuits and conductors, dealing with both the electric and magnetic circuits and electromagnets, and the various problems which arise in connection with them. After this complete and systematic introduction, the simple telegraph circuits and equipment are taken up. The single Morse circuits are first discussed, after which electrical measuring instruments and methods of testing circuits are described. Following a chapter on speed of signaling and circuit efficiency, single line repeaters are discussed and descriptions given of the various types. The more complex circuits of the duplex, quadruplex, and other multiplex and automatic apparatus used in telegraphy are described at considerable length.

The effects of induction from alternating circuits on telegraph and telephone and methods of eliminating them are taken and explained clearly. There is an instructive chapter on simultaneous telegraphy and telephony over the same wires, which is of value to railroad men.

Specifications for wire and cable used in telephone work are given, while the electrolysis of underground cable sheaths receives considerable attention. The appendix contains much data of value to telegraph workers.

The book is written in a clear and systematic manner, so that the reader has no difficulty in following the various steps. It should be of great use to telegraph wire chiefs and workers, also any one desiring a clear and comprehensive insight into the workings of the telegraph.

To Remove Old Union Electric Wires at Rock Island, Ill.

The city council of Rock Island, Ill., has directed the city electrician to employ linemen and remove such wires and other equipment of the old defunct Union Electric Telephone & Telegraph Co. as he regards to be a menace to the public. Some days ago the city electrician, while looking over city lines, found many of the abandoned wires of the Union Electric company in such condition that they were likely to become broken and entangled with other wires carrying high voltages, and thus endanger life.

No attempt has been made by the Union Electric company during the past two years, to operate its exchanges. An effort was made to secure an ordinance to sell the plant to the Central Union, and the council granted the ordinance, but the people, on a referendum, failed to approve it.

Legal Cases and Decisions

By A. H. McMillan

More Induction.

"We write you to inquire if you have any decisions and legal cases that would throw any light on the following situation, and, if not, what recourse have we in a legal way? We and some three or four neighboring telephone systems have always operated their country party lines with the ground as one side of circuit. For our long distance connection we have metallic circuit transposed every half mile. This condition has been satisfactory until recently the Engineering Corporation completed their power transmission line and turned 110,000 volts on with more yet to be turned on. They own a 100 ft. right of way and have their lowest cables nearly 50 ft. high. Their right of way runs parallel with our lines in a general direction for 14 miles, but is never as close as 100 ft. (and then for but ¼ mile in two places) to our lines, except at points of crossing. The noise threatens to ruin our service on all lines in such proximity to the power line. The building of complete metallic circuit would work a hardship which we wish to avoid."

It is incumbent upon a telephone company to so erect its lines in the street that an electric railway company to be afterwards built shall not be obstructed in its use of the streets by the necessity of avoiding interference by induction with the telephone company's lines. The telephone company cannot recover for any inconvenience or loss which it may suffer from the adoption of a legally authorized mode of locomotion which is carefully and skillfully employed and which does not destroy the use of the highway as a public way. Hudson River Telephone Co. vs. Watervliet Turn Pike R. R. Co., 135 N. Y., 394, 32 N. E., 148. A full discussion of the question raised by you will appear soon in these columns with an abstract of decisions on the subject.

Possible Interference.

"We have poles with a ten-pin arm and one bracket line leading out from our corporation east. A part of said wires are metallic and others grounded party lines working in good condition.

"Now there is a light and power company setting poles and is going to run high tension wires up through and over this lead of ours using 6,600 and 13,000 volts, on 25 ft. and 30 ft. poles and across other wires of ours, a part of which are grounded lines. Have we any recourse? Have they a right to run these dangerous high tension wires on the public highway?"

The question of whether a light and power company has a right to run a dangerous high tension wire upon the public highways depends upon the authority it has received from the public. Between your company and the light and power company, you are entitled to protection against interference by induction from their lines. This protection may take the form of damage for injuries done, or an injunction to restrain them from stringing their wires in proximity to yours. Nebraska Telephone Co. vs. York Gas & Electric Light Co., 22 Neb., 284. An article will be published soon in these columns discussing the general subject of induction at length with a brief abstract of several cases on the subject.

Extension Sets.

"We find several persons selling to our subscribers poorly constructed extension set telephones, which they attach to our wires at the main station. We will thank you to quote us legal decisions on the subject, and any additional facts will be appreciated."

A telephone company is not obliged to permit a subscriber to attach a private set of extension instruments to its line, unless it is unprepared or has neglected to furnish approved appliances of that kind, or has demanded exorbitant rates. Even then the subscriber could not demand the connection of his set to the company's line, unless it caused no detriment to the company in the demand it would make upon its service, or in safety to the company's system, employes and subscribers. Gardner vs. Providence Telephone Co., (R. I.), 49 Atlantic 1004.

Tree Trimming.

"Will you kindly advise through the columns of your department what the law in Iowa is regarding the trimming of trees where they interfere with telephone wires? Does it make any difference whether the main body of tree is on private property or in the highway or street? Is the law the same for towns as it is for country roads? We cut down a small tree that interfered with our wires. This tree was just outside of fence of farmer, of no apparent value as far as we could see, it being located at a distant part of the farm and was not considered a fruit or a shade tree. Our lines or wires have been in this location for ten years while the tree was about six years old, it having grown up under the wires long after we built our lines. Has a farmer any right, ownership or control of trees along the public highway?"

In Iowa a company that has the right to use the highway in front of the abutting property may trim trees reasonably without being called on to pay damages. Meyer vs. Standard Telephone Company (Iowa), 98 North Western 300.

It does not make any difference in the case you mention whether the main body of the tree is on private property or in the highway. The rule in respect to country highways is less strict than as to streets, for a tree that would be of no value whatever in the country might be highly useful in the city for purposes of shade and ornamentation. But, whether the tree was in the city or country a company trimming it more than absolutely necessary to give free passage for its wires is liable for unnecessary damages. A farmer who is the owner of land abutting on the highway, has an interest in the soil of the highway and as the trees are considered part of the soil, his interest extends to them also. Pierce vs. Drew, 136 Massachusetts 75, 49 American Reports 7. McMillan on Telephone Law, Chapter XIV.

Liability for Personal Injury Between Joint Pole Users.

One telephone company, which sells to another the right to maintain a wire upon its poles, is liable to an employe of the other company, who is himself free from fault, for an injury occasioned by the failure of the owning company to use reasonable diligence to keep the poles in such condition that they may be used with safety in the customary manner. Such was the holding of the Supreme Court of Kansas in a suit brought by a lineman, who was following a crew that was taking wires from old poles, for the purpose of removing two remaining wires, and who was injured by a pole falling with him.

The breaking of the pole was caused by a weakness not discoverable by mere observation. The company was held not to be necessarily relieved from liability by the fact that it was engaged in replacing the old poles. Nor was the general warning to the workman to be careful while removing the wires necessarily sufficient to remove the owning company from further responsibility. Neither was the owning company exempt from liability on the ground that the workman was bound at his peril to ascertain the condition of the pole before climbing it. Aaron vs. Missouri & Kansas Telephone Co., 131 Pacific, 582.

Safety Appliances.

Suit was brought for negligence of a telephone company in installing and maintaining a telephone in a house without a lightning arrester. An accident had happened by heavy charge of electricity being carried into the house during a thunder storm and injuring the nervous system of the plaintiff's wife. The defense was that the injury was due to the "act of God." The court held that the defendant company was under obligation in the exercise of due care to provide such appliances as were reasonably necessary to guard against such an accident, including lightning arresters, even though there was testimony on the part of the company to the effect that lightning arresters were installed for the purpose of protecting the telephone from lightning and not for the purpose of protecting the occupants of the house. South Western Telegraph & Telephone Co. vs. Davis, 156 S. W., 114.

Value of Right to Cross Bridge.

A telegraph company began proceedings to condemn the right to string its wires over the Kansas portion of a bridge belonging to the Leavenworth Railway & Bridge Co. The only question for the jury was the amount of damages to be awarded. The measure of damages used in examination of witnesses by the court was the difference between the value of the structure before and after its appropriation for the wires of the telegraph company. The jury allowed $1,000 for additional trouble in turning the draw and $200 for the wearing off, or scraping off, of paint by the telegraph company's employes.

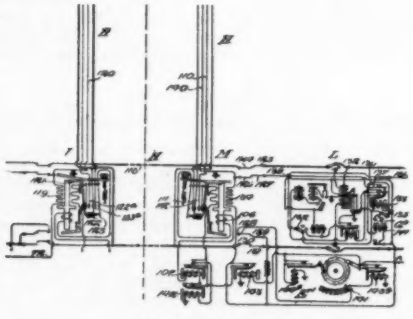
The defendant insisted that the first item was unwarranted by the evidence, and the second imaginary. The court however sustained the items, holding that evidence was introduced which justified these allowances and that the fairness of the jury was shown by disallowing various items claimed and more or less supported. The total damage was fixed by the bridge company's witnesses at from $8,000 to $10,000, about 60 per cent. being the Kansas portion. The only witness for the wire company who assumed to fix the damage, estimated it at $722.

The jury was instructed that it might consider, among other things, "the future damages that might accrue to said bridge by reason of personal property being injured thereby by reason of said wires falling by storm or other causes." It was insisted that this left the jury to conjecture causes including the negligence of the bridge company. An allowance of $545 for damages to personal property on the bridge under this charge was made. The court said that it did not find anything in the evidence showing, or tending to show, the presence of any personal property on the bridge likely to be damaged by reason of the wires, so this item was deducted.

The wire company requested an instruction that the jury should not consider the mere possibility that some of its cables might at some time be injured by trains moving across the bridge; the mere possibility that the wire or cable of the telegraph company might at some future time come in contact with high tension electric wires and damage the bridge; and that at some remote time in the future, the bridge company might wish to reconstruct its bridge and that the wire company's cable or apparatus might interfere therewith. The refusal to give this instruction was held not to be error, because the jury allowed nothing for any of the items of damage mentioned therein. Postal Telegraph-Cable Co. vs. Leavenworth Railway & Bridge Co., 131 Pacific, 143.

Record of Telephone Patents Recently Issued

1,064,719. June 17, 1913. TELEPHONE TRUNKING SYSTEM; E. D. Fales, La Grange, Ill.; assigned to the Automatic Electric Co. Relates to a two-wire automatic system in which a two-way trunk line is provided with non-numerical trunking switches, at each end to automatic select idle trunks, thus extending a trunking connection in the direction of the called subscriber.



No. 1,064,719.

1,064,997. June 17, 1913. SIGNALING SYSTEM; H. O. Rugh, Sandwich, Ill.; assigned to the Hall Switch & Signal Co. Describes a telephone train dispatching system with a step by step selector mechanism, magnets, and a controlling relay at each substation. The current for operating the substation mechanism is supplied from the central station.

1,064,998. June 17, 1913. TELEPHONE CALL RECORDER; H. K. Sandell, Chicago; assigned to Herbert S. Mills. Describes the combination of a clock movement and an overtime register with a lost motion connection between them, whereby the clock mechanism can run for a definite period before moving the overtime register.

1,065,014. June 17, 1913. COIN ACTUATED TELEPHONE ATTACHMENT; G. P. Wriborg, Athelstane, Wis. The feature is a gravity actuated latch which is released when a coin is inserted in the coin slot, thus releasing the telephone mechanism for use.

1,065,038. June 17, 1913. PROTECTOR FOR TELEGRAPH AND TELEPHONE CROSS ARMS AND PINS; Henry Grant Newell, LeRaysville, Pa. This protector consists simply of a washer of galvanized iron or other metal. The saw-tooth edges of the hole in the center of the washer are upturned, forming a flange on to which the pin is driven. The washer also has a downward flange on its perimeter, which, when the pin is driven into the cross arm, firmly holds it to the arm, preventing moisture from getting in between the pin and the arm, thus to prevent decay and other trouble.

1,065,570. June 24, 1913. TELEPHONE RECEIVER SUPPORT; C. D. Wightman, Glenwood Springs, Colo. The receiver is mounted on a hinged tube attached to the rim of the transmitter case. The circuit is closed when the pivoted arm carrying the receiver is raised to the ear.

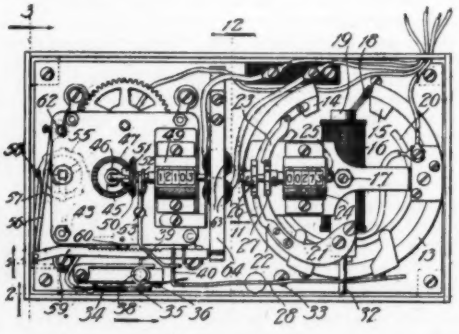
1,065,628. June 24, 1913. SIGNAL SENDING DEVICE; H. O. Rugh, Sandwich, Ill.; assigned to the Hall Switch & Signal Co. Describes a station selector for telephone train dispatching. It is designed for use at central stations to call a number of substations connected with the same line wires and which are of the step by step, or impulse, type of mechanism.

1,065,805. June 24, 1913. TELEPHONE ATTACHMENT; Simon J. Heimbuecher, Jr., Pittsburgh, Pa. The feature of this patent is a lazy tongs structure carrying the receiver and attached to the receiver hook. It is arranged to be extended to the telephone user's ear when talking.

1,066,051. July 1, 1913. ELECTRICAL SWITCHING APPARATUS; J. C. Rinker, New York; assigned to the Western Electric Co. Describes the combination in a switching apparatus of an electrical contact with a complementary movable contact into either of two positions. This is accomplished by a pair of superposed balls confined in a call supported by the movable contact. Has a dustproof and moisture-proof cover.

1,066,176. July 1, 1913. TELEPHONE CALL REGISTER; W. G. Bell, Newton, Mass., and W. H. Vinto, Boston, Mass.; assigned to W. G. Bell. Describes a register having provision for separately recording in and out calls, toll calls, and other calls.

1,066,388. July 1, 1913. SANITARY TELEPHONE ATTACHMENT; G. W. Downs, New York. Describes a mouthpiece sanitary attachment consisting of a sheet material, formed so as to slip over the mouthpiece.



No. 1,064,998.

1,066,786. July 8, 1913. LOCKING DEVICE FOR TELEPHONES; C. C. Bielitz, Brooklyn, N. Y. Consists of a removable metal collar, attachable to the standard of a desk stand. A removable yoke is arranged to straddle the stem of the switch hook, with an extension adapted to fit into an out turned portion of the metal collar. A padlock passing through the yoke and the collar locks the instrument in a non-operative position.

The Telephone Engineer's Imaginary Mexican Escapade

In Which Our Hero Invents a Pocket Wireless Telephone Instrument, Acts as a Spy in a Mexican Battle, Holds Conversations With His Friends at Will While in the Enemy's Ranks and Wakens to Find It All a Dream

By J. D. Archer

Elbridge Bemis, expert telephone engineer, had just completed a strenuous day's work in the laboratory of the telephone company in whose employ he had labored successfully for many years, and on his way to his home in the evening incidently met up with his old time friend, Dick Manning, star reporter on the Tribune staff, and after a hearty exchange of greetings, they fell to discussing topics of common interest, during the course of which Manning exclaimed: "By the way, El., anything new in the matter of that wireless telephone you were evolving when I last saw you?"

"Oh, I'm still working at it," replied the engineer earnestly, "It's a sure thing. Only a matter of time, that's all."

"By George! Bemis, if you can put that over, it means easy street for you, and no mistake. Cracky! What wouldn't General Felix Diaz give to have one of those instruments in a leather case at his side and a corresponding instrument in the hands of a trusted spy within the lines of the enemy? Couldn't he make short work of the federal forces?"

"He could complete the whole job before breakfast some fine morning," assented Bemis as they separated.

Once arrived home, Bemis dispatched his dinner hurriedly, filled his briar pipe and dropped into his Morris chair with a sigh of comfort.

Manning's words recurred to his mind and he mused for a time on the possibilities awaiting the completion of his invention, a wireless telephone the peculiar feature of which consisted of a polished steel bulb enclosing a very delicate mechanism so attuned and sensitized that the depression of the small button at the base of the bulb of one instrument would result in the ringing of the bell in one or more correspondingly attuned instruments, also a simultaneous establishing of speech transmitting connections, regardless of the distance separating the speakers. After a time he fell to dozing, his chin sank lower and lower, and soon deep, long-drawn snoring told that he was sleeping.

As he slept he dreamed.

His dream vision first focused itself upon two men in civilian clothing who were creeping stealthily toward an army encampment, through dense tangles of sagebrush. Obviously the scene was that of Old Mexico, and the encampment that of the Rebel army commanded by General Diaz. Not far distant numerous camp fires were plainly visible against the evening sky, accentuated at frequent intervals by the silhouetted figures of men moving backward and forward.

Suddenly Bemis became entangled in a thick growth of underbrush, and dropped helplessly into it with a loud crackling of dry twigs.

"Halt! Who goes there?" rang out sharply.

"A friend," replied Manning, surprised at being accosted in his native tongue.

"Two of 'em, in fact," added the engineer, as he scrambled quickly to his feet.

"Advance and give the countersign," commanded the sentry, presenting the point of his bayonet.

"We would gladly oblige you, kind sir, if we knew it," replied the engineer, smiling grimly, "but our vocabulary is just a trifle short on the Mexicanus Verbalissimus."

"Forward to headquarters with you then," persisted the sentinel, inclining his head in the direction of the campfires.

"You are an American, to all appearances," observed the reporter, looking their captor over critically. "Are there no Mexican soldiers in the Rebel army?"

"Well, I reckon so," laughed the soldier meaningly, "as you will probably ascertain later. You just chanced onto a friendly beat, that's all. Fortunes of war, you know."

"But, say my good fellow, if you take us to headquarters you will have to tell his nibs, your general, who we are. We cannot," parleyed Manning.

"No saba Spanish?" inquired the sentinel.

"Saba the devil. Never needed anything but United States in my business before," snarled the engineer.

"This is a mighty unsafe place for your kind to be prowling around in right now," ventured the soldier. "If some suspicious greaser don't puncture both of you before we get to camp, I'll be surprised."

"Quite comforting intelligence, indeed," quoth the reporter, upon which they proceeded silently in advance of their captor toward the camp fires, thence up a long lane of tents of varied sizes, colors and descriptions, in front of which were fires about which lounged scores of dark visaged soldiers, some in full rebel uniform and others in semi-civilian clothes. They finally brought up before a tent much larger than the others, at the extreme head of the column. As they passed up this improvised streetway, a number of curious, silent Mexicans fell in alongside of the sentinel, all the while eyeing the strangers in anything but a friendly manner. Then one of them, an angular, hungry looking individual, questioned the sentinel in Spanish, to which he responded in like manner.

Bringing them to a stop before the large tent, the guard hailed an orderly who saluted and disappeared into the tent.

Meanwhile the momentarily augmented crowd of soldiers pressed in closer upon the prisoners and mutterings became audible among them, their speech being a conglomerate of Spanish and English.

"American dogs! Spies! Madero amici!" hissed the tall soldier who had accosted the sentinel, and he sprang upon the engineer, flourishing a large dagger, the polished blade of which flashed keenly in the moonlight. Others pressed in upon the reporter. The sentinel was thrust aside as he attempted to protect his captives.

"Down with them," cried a voice in the rear of the crowd.

At this juncture a tall man in the uniform of a general emerged from the tent, and discerning at a glance that trouble was afoot, stepped quickly to the middle of the circle, thrusting several soldiers aside as he came, and laid a restraining hand upon the dagger as it was about to descend.

"Hold," he said in a tone of quiet firmness, lifting his hand with a commanding gesture.

The offending soldiers draw back sullenly but respectfully, while the tall soldier sheathed his weapon reluctantly and waited.

"What is the meaning of all this?" he inquired, addressing the guard who stepped forward and saluted as he replied:

"A couple of strays, General, whom I just picked up out on the line. I trust they will be able to explain their presence here to your satisfaction."

"Americans, eh!" the officer observed after looking the two over closely.

"Yes sir," replied the reporter promptly.

"Friends or spies?" still regarding them sharply.

"Friends," broke in the engineer. "We wish to join your army."

"For what reason?"

"Primarily we wish to make an experiment in the cause of science, and secondly, because we are friendly to the cause of the great Diaz. We have therefor come to offer ourselves and our service in behalf of your splendid enterprise."

"A peculiar not to say hazardous mission, indeed," remarked the general cautiously. "What is the nature of this experiment?"

"We would speak with you in private of that, General, if we may."

The officer studied a moment, then spoke to the group of soldiers in Spanish, upon which they began at once to disperse. He then motioned for the two prisoners to enter the tent. This they did, whereupon, after a word with his orderly, he too entered, drawing the flap of the tent after him.

The footsteps of the sentinel could be heard distinctly as he paced to and fro outside.

The general motioned for them to be seated.

"You can speak freely here."

"Very well, General Diaz, I will be brief. The experiment we have in mind is this: We have just perfected and obtained a United States patent for a wireless telephone apparatus so constructed that it can be secreted about one's person and so devised that when the polished bulb is exposed and the button repressed the bell rings on a corresponding instrument thus signaling the bearer of that instrument and making it possible for him to hold conversation with the person signaling, regardless of the distance separating the two persons at the time."

"That seems impractical," ventured the veteran, regarding the instruments critically as both the engineer and the reporter produced their instruments from their leather cases and held them up for inspection.

"However, it is not," urged the engineer. "Successful tests have been made at a distance of more than 500 miles. Inspect this instrument for yourself."

The officer took the instrument and examined it with grave interest. The engineer took the other instrument from the reporter.

"Just depress the button you see at the base of the bulb and place the receiver to your ear."

The request was obeyed, upon which the bell pealed out gingerly. Other tests were made, at the success of which the officer marveled greatly.

"Our plan, General Diaz, was for you to retain my friend here in your camp with one instrument and allow me to go into the camp of the Federals, after which we guarantee to keep you advised of each move made by them and of every weak point in their defences about Mexico City," continued the engineer.

"Do you realize that your experiment may mean death to you?"

"I do, General Diaz, but I am convinced of the value of my invention, and I am willing to take all accruing risks in the cause of science, for which I impose but one condition."

"And what is that condition?"

"That when once you have conquered and become supreme ruler of the province of Mexico, you will give to our invention the preference over all others now in use in your country; in other words, that you pledge to us a 50-year franchise in return for which we agree to make you president of Mexico."

General Diaz sat for a few moments in deep thought, from time to time inspecting the instrument anew.

Finally he looked up and said quietly, while deep in his eyes a strange light was burning:

"I accept your proposition. When can you make this undertaking?"

"I shall endeavor to cross the lines of the enemy at once, sir."

"It is well. I will send a man to guide you to the outer picket of the federal lines."

He stepped to the entrance of the tent and called out in Spanish whereupon an orderly appeared, received instructions and darted away again.

Soon he returned bringing with him another Mexican, with whom the officer conversed for a moment upon which the soldier saluted and turned to the engineer and again saluted as he said:

"Ready, senor?"

"Ready," responded the engineer briefly. "Keep the bulb exposed, Manning, and be on the job all the time."

"Eternal vigilance is my hobby," returned the reporter warmly.

A moment later the engineer was again threading his way through thick brambles, over rock and through dark canons in the wake of the silent Mexican, in the direction of the city.

At length the guide stopped.

"Wait. Daylight most good. Saba?" he said in broken accent.

"Surely. Me saba."

"Bueno noche, senor."

"Bueno noche yourself, what ever that is," muttered the engineer upon which the guide grinned, saluted, and a moment later was swallowed up in the darkness.

(To be continued.)

Telephone Controversy at Olivet, Mich.

The little town of Olivet, Mich., the home of the Congregational college, is torn up in a telephone war and the Michigan Railroad Commission has been petitioned to interfere and adjust an alleged injustice to local subscribers. It is declared that discriminatory rates are made between the towns of Olivet and Bellevue, another small village, to the detriment of Olivet.

A short time ago the Olivet business men asked that individual rates for service be maintained at the same price as party service, which had previously prevailed. The Michigan State Telephone Co. refused and the resident subscribers and farmers in the surrounding country joined in the demand. Upon repeated refusals the subscribers held a public meeting and resolved to order their telephones out. After some time in attempt at conciliation the subscribers and the company both stood firm. In spite of a clause in the contract the company had on its own motion given party rates for individual service, but lately decided to confine itself to the terms of the contract. Then the Olivet people took up the Bellevue matter and a member of the rialroad commission is making an investigation of the matter.

Invoking Referendum to Defeat Colorado Commission Act.

By paying canvassers ten cents a piece for each name, D. A. Camfield, an irrigation and power project promoter of Colorado, has secured 18,000 signatures to a petition, asking for a referendum on the public utilities commission bill recently passed by the Colorado legislature, and signed by Governor Ammons. This is the number of signatures required under the referendum section of the law. N. D. Smith, who is promoting an automatic telephone company for Denver has secured, in a similar way, the same number of signatures, asking that certain sections of the bill be referred.

Governor Ammons believes that this method of securing signatures is contrary to the spirit of the law and has considered calling a special session of the legislature to revise the initiative and referendum feature of the act. He believes it should be made a punishable offense to secure signatures under this act for pay.